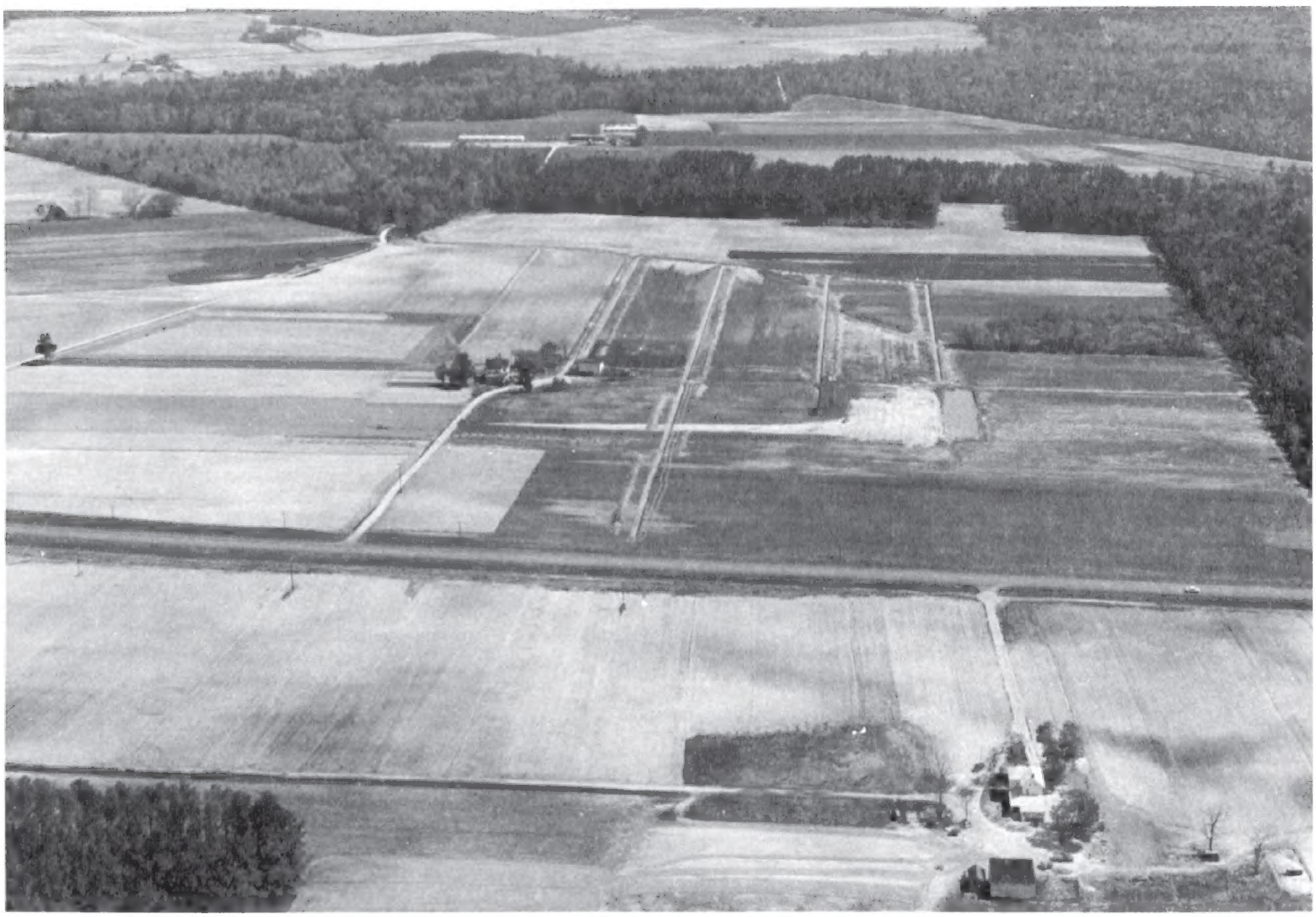
Issued January 1970

SOIL SURVEY

Wicomico County, Maryland



UNITED STATES DEPARTMENT OF AGRICULTURE
Soil Conservation Service
In cooperation with
MARYLAND AGRICULTURAL EXPERIMENT STATION

Major fieldwork for this soil survey was done in the period 1948–63. Soil names and descriptions were approved in 1966. Unless otherwise indicated, statements in the publication refer to conditions in the county in 1966. This survey was made cooperatively by the Soil Conservation Service and the Maryland Agricultural Experiment Station; it is part of the technical assistance furnished to the Wicomico Soil Conservation District.

Either enlarged or reduced copies of the soil map in this publication can be made by commercial photographers, or can be purchased, on individual order, from the Cartographic Division, Soil Conservation Service, USDA, Washington, D.C. 20250.

HOW TO USE THIS SOIL SURVEY

THIS SOIL SURVEY of Wicomico County, Md., contains information that can be applied in managing farms and woodlands; in selecting sites for roads, ponds, buildings, or other structures; and in judging the suitability of tracts of land for agriculture, industry, or recreation.

Locating Soils

All of the soils of Wicomico County are shown on the detailed map at the back of this survey. This map consists of many sheets that are made from aerial photographs. Each sheet is numbered to correspond with numbers shown on the Index to Map Sheets.

On each sheet of the detailed map, soil areas are outlined and are identified by symbol. All areas marked with the same symbol are the same kind of soil. The soil symbol is inside the area if there is enough room; otherwise, it is outside and a pointer shows where the symbol belongs.

Finding and Using Information

The "Guide to Mapping Units" can be used to find information in the survey. This guide lists all of the soils of the county in alphabetic order by map symbol. It shows the page where each kind of soil is described, and also the page for the capability unit and woodland suitability group in which the soil has been placed.

Individual colored maps showing the relative suitability or limitations of soils for many specific purposes can be developed by using the soil map and information in the text. Translucent material can be used as an overlay over the soil map and colored to show soils that have the same limitation or suitability. For example, soils that have a slight limitation for a given use can be colored green, those with a moderate limitation can be colored yellow, and those with a severe limitation can be colored red.

Farmers and those who work with farmers can learn about use and management of the soils in the soil descriptions and in the discussions of the capability units and woodland suitability groups.

Foresters and others can refer to the subsection "Use of Soils as Woodland," where the soils of the county are grouped according to their suitability for trees.

Game managers, sportsmen, and others concerned with wildlife will find information about soils and wildlife in the subsection "Wildlife."

Community planners and others concerned with areas of expanding industry and housing can read about the soil properties that affect the choice of homesites, industrial sites, schools, and parks in the subsection "Use of Soils in Community Development."

Engineers and builders will find, under "Engineering Uses of Soils," tables that give engineering descriptions of the soils in the county and that name soil features that affect engineering practices and structures.

Scientists and others can read about how the soils were formed and how they are classified in the section "Formation, Morphology, and Classification of Soils."

Newcomers in Wicomico County may be especially interested in the section "General Soil Map," where broad patterns of soils are described. They may also be interested in the section "General Nature of the County."

***Cover picture.*—Characteristic nearly level landscape in the Matawan-Norfolk soil association, which is extensive in the central part of the county. The soils are mainly the well drained Norfolk and the moderately well drained Matawan soils, but there are some shallow, depressional areas of soils that need to be drained.**

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BY RICHARD L. HALL, SOIL CONSERVATION SERVICE

SOILS SURVEYED BY C. D. CROCKER, C. E. EMERY, R. FEUER, R. L. HALL, F. Z. HUTTON, SR., D. C. LEER, AND M. R. NICHOLS, SOIL CONSERVATION SERVICE

UNITED STATES DEPARTMENT OF AGRICULTURE IN COOPERATION WITH MARYLAND AGRICULTURAL EXPERIMENT STATION

WICOMICO COUNTY is on the peninsula that lies between the Atlantic Ocean and the Chesapeake Bay. It is in that part of Maryland called the Eastern Shore (fig. 1). The county is roughly rectangular in shape; it extends about 30 miles from east to west and in most places, about 12 miles from north to south. Its total area is 243,200 acres, or 380 square miles. Salisbury, the county seat, is near the center of the county.

About half of the county is in farms. The main farm enterprise is raising chickens as broilers, most of which are processed locally before they are shipped to market. Corn and soybeans are the principal crops and are grown for poultry feed. Also important are truck crops. The greatest amount of these is processed before shipment to metropolitan markets nearby.

About 47 percent of the county is covered with trees. Wooded areas are used for producing timber, as well as for hunting and other forms of recreation.

How This Survey Was Made

Soil scientists made this survey to learn what kinds of soils are in Wicomico County, where they are located, and how they can be used.

They went into the county knowing they likely would find many soils they had already seen, and perhaps some they had not. As they traveled over the county, they observed steepness, length, and shape of slopes; size and speed of streams; kinds of native plants or crops; kinds of rock; and many facts about the soils. They dug many holes to expose soil profiles. A profile is the sequence of natural layers, or horizons, in a soil; it extends from the surface down into the parent material that has not been changed much by leaching or by roots of plants.

The soil scientists made comparisons among the profiles they studied, and they compared these profiles with those in counties nearby and in places more distant. They classified and named the soils according to nationwide, uniform procedures. To use this survey efficiently, it is necessary to know the kinds of groupings most used in a local soil classification.

Soils that have profiles almost alike make up a soil series. Except for different texture in the surface layer, all the soils of one series have major horizons that are similar in thickness, arrangement, and other important characteristics. Each soil series is named for a town or other geographic feature near the place where a soil of that series was first observed and mapped. Matapeake and Pocomoke, for example, are the names of two soil series. All the soils in the United States having the same series name are essentially alike in those characteristics that go with their behavior in the natural, untouched landscape. Soils of one series can differ somewhat in texture of the surface soil and in slope, stoniness, or some other characteristic that affects use of the soils by man.

Many soil series contain soils that differ in texture of their surface layer. According to such differences in texture, separations called soil types are made. Within a series, all the soils having a surface layer of the same texture belong to one soil type. Matapeake silt loam and Matapeake fine sandy loam are two soil types in the Matapeake series. The difference in texture of their surface layers is apparent from their names.

Some types vary so much in slope, degree of erosion, number and size of stones, or some other feature affecting their use, that practical suggestions about their management could not be made if they were shown on the soil map as one unit. Such soil types are divided into phases. The name of a soil phase indicates a feature that affects management.

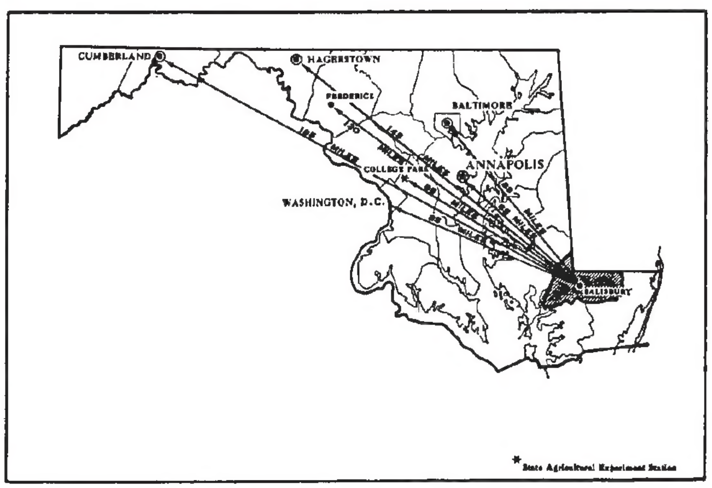

Figure 1.—**Location of Wicomico County in Maryland.**

For example, Norfolk loamy sand, 2 to 5 percent slopes, is one of several phases of Norfolk loamy sand, a soil type that ranges from nearly level to sloping.

After a guide for classifying and naming the soils had been worked out, the soil scientists drew the boundaries of the individual soils on aerial photographs. These photographs show woodlands, buildings, field borders, trees, and other details that greatly help in drawing boundaries accurately. The soil map in the back of this survey was prepared from aerial photographs.

The areas shown on a soil map are called mapping units. On most maps detailed enough to be useful in planning management of farms and fields, a mapping unit is nearly equivalent to a soil type or a phase of a soil type. It is not exactly equivalent, because it is not practical to show on such a map all the small, scattered bits of soil of some other kind that have been seen within an area that is dominantly of a recognized soil type or soil phase.

In preparing some detailed maps, the soil scientists have a problem of delineating areas where different kinds of soils are so intricately mixed, and so small in size, that it is not practical to show them separately on the map. Therefore, they show this mixture of soils as one mapping unit and call it a soil complex. Ordinarily, a soil complex is named for the major kinds of soil in it, for example, Evesboro-Galestown sands, 5 to 15 percent slopes.

Another task is that of delineating areas where two or more soils occur together without regularity in pattern and proportion. These soils are mapped together as one unit, called an undifferentiated mapping unit. At least one of the component soils occurs in every delineated area. The soils of an undifferentiated unit are similar enough in behavior that their separation is not important for the objectives of the survey. An example of an undifferentiated unit is Norfolk and Sassafras soils, 10 to 15 percent slopes.

Most surveys include areas where the soil material is so rocky, so shallow, or so disturbed or modified that it cannot be classified by soil series. These areas are shown on the map like other mapping units, but are given descriptive names, such as Borrow pits or Tidal marsh, and are called land types.

While a soil survey is in progress, samples of soils are taken, as needed, for laboratory measurements and for engineering tests. Laboratory data from the same kinds of soils in other places are assembled. Data on yields of crops under defined practices are assembled from farm records and from field or plot experiments on the same kinds of soils. Yields under defined management are estimated for all the soils.

But only part of a soil survey is done when the soils have been named, described, and delineated on the map, and the laboratory data and yield data have been assembled. The mass of detailed information then needs to be organized in a way that it is readily useful to different groups of readers, among them farmers, managers of woodland, engineers, and homeowners. Grouping soils that are similar in suitability for each specified use is the method of organization commonly used in the soil surveys. On the basis of the yield and practice tables and other data, the soil scientists set up trial groups, and then test them by further study and by consultation with farmers, agronomists, engineers, and others. Then, the scientists adjust the groups according to the results of their studies and consultation. Thus, the groups that are finally evolved reflect up-to-date knowledge of the soils and their behavior under present methods of use and management.

General Soil Map

The general soil map at the back of this survey shows, in color, the soil associations in Wicomico County. A soil association is a landscape that has a distinct proportional pattern of soils. It normally consists of one or more major soils and at least one minor soil, and it is named for the major soils. The soils in one association may occur in another, but in a different pattern.

A map showing soil associations is useful to people who want a general idea of the soils in a county, who want to compare different parts of a county, or who want to know the location of large tracts that are suitable for a certain kind of farming or other land use. Such a map is not suitable for planning the management of a farm or field or choosing the site for a building or other structure, because the soils in any one association ordinarily differ in slope, depth, stoniness, drainage, and other characteristics that affect management.

The nine soil associations in Wicomico County are discussed in the following pages.

1. Fallsington-Woodstown-Sassafras Association

Level to rolling, poorly drained to well-drained soils that have a subsoil of friable sandy clay loam; on uplands

This association is made up of level to rolling soils in fields and some wooded areas (fig. 2). The soils are level or nearly level in most of the association, though they have slopes of 2 to 5 percent in some places and are fairly steep in small areas. The native vegetation consists chiefly of loblolly pine and hardwoods, but in some places loblolly pine grows in almost pure stands. The association occurs in the western, west-central, and southeastern parts of Wicomico County. It covers about 41,000 acres, or 17 percent of the county.

Of the total acreage in the association, the Fallsington soils account for about 45 percent; the Woodstown soils, 25 percent; and the Sassafras soils, 20 percent. Generally, all of these soils have a surface layer of sandy loam or fine sandy loam and a subsoil of sandy clay loam. In some places, however, the surface layer is loam.

The level or nearly level Fallsington soils occur in large areas and are poorly drained. The Woodstown soils, which are moderately well drained, have slopes of less than 2 percent in about 85 percent of their acreage. The Sassafras soils are deep and well drained. Commonly, they are the most sloping soils in the association.

Also in the association are the excessively drained Evesboro soils, the sandy Klej and Downer soils, and the very poorly drained Pocomoke soils, which have a black surface layer. These and other minor soils generally occupy small areas. They make up about 10 percent of the association.

The major soils are only moderate in natural fertility, but they respond well to good management, including the

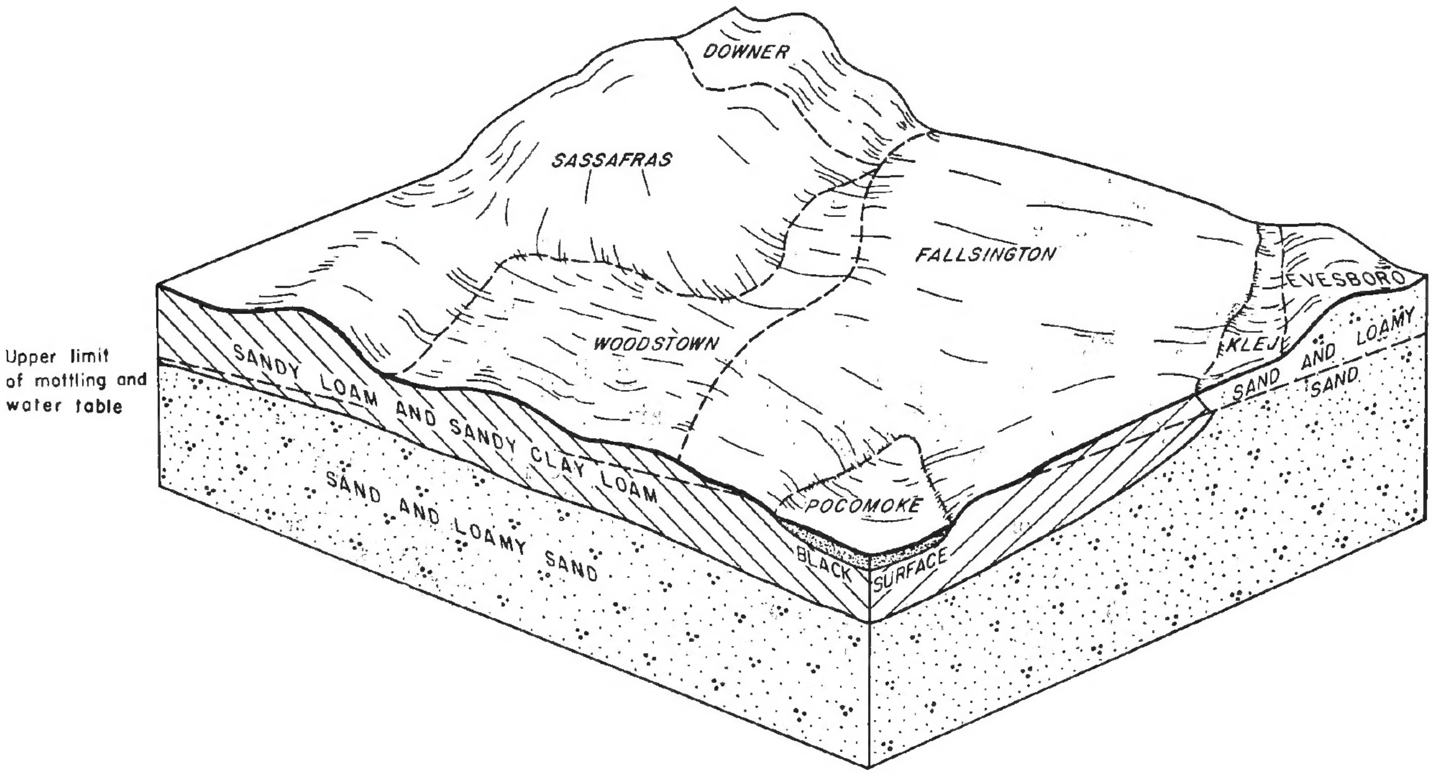

Figure 2.—**Cross section showing typical soil pattern in the Fallsington-Woodstown-Sassafras association.**

use of fertilizer. If they are carefully managed, they can produce a favorable growth of nearly all crops common in the county. Alfalfa and some other perennial crops, however, may be damaged by frost action on soils that are not well drained.

The Fallsington and Woodstown soils must be drained before they can be fully used for farming. Fallsington soils require a complete drainage system, but they can be drained fairly easily by tile or ditches if outlets are adequate. After drainage is improved, the Fallsington soils are suited to many kinds of crops. They are most commonly used for corn and soybeans. Drained areas are easily managed and normally are subject to little erosion.

Generally, the Woodstown soils require less improvement in drainage than the Fallsington soils. Particularly needed is the removal of excess surface water from the more nearly level areas during planting and the early part of the growing season.

Except for slope and susceptibility to erosion in small areas, the Sassafras soils have practically no limitations that affect their use for farming. These soils respond well to supplemental irrigation during prolonged dry periods.

For disposing of sewage effluent from septic tanks, the Sassafras soils have few or no limitations, but the Woodstown and Fallsington soils are of limited use because the water table is high in wet periods. In all other respects the Woodstown and Sassafras soils have few or no characteristics restricting their use for residential developments. Even if the Fallsington soils are drained, however, their use for such developments is limited.

2. Matapeake-Mattapex-Othello Association

Level to sloping, well-drained to poorly drained soils that have a subsoil mainly of firm silty clay loam or silt loam; on uplands

This association is made up of deep, level to sloping, loamy soils. About a third of the total area is well drained, a third is moderately well drained, and the rest is poorly drained. The soils generally have slopes of less than 2 percent, and in only a few places is the slope greater than 5 percent. Although trees cover a few areas, mainly of poorly drained Othello soils, nearly all of the association has been cleared and is used for crops. The woodland consists either of hardwoods or of loblolly pine growing in pure or almost pure stands. Generally, the pure stands of loblolly pine occur in old fields that have reverted to trees.

This association occurs around Allen and in a narrow band along the Wicomico River in the southwestern part of the county. It occupies only about 7,200 acres, or roughly 3 percent of the total area.

The major soils of the association are the Matapeake, Mattapex, and Othello. The Matapeake soils make up about 30 percent of the association; the Mattapex soils, 30 percent; and the Othello soils, 30 percent.

The well-drained Matapeake soils have a surface layer of fine sandy loam or silt loam and a subsoil that is mainly brown to strong-brown heavy silt loam or silty clay loam. These soils are underlain by sandy material at a depth of about 3 feet. Typically, they are more sloping than other soils in the association.

The moderately well drained Mattapex soils have a loam or silt loam surface layer and a silty clay loam or heavy silt loam subsoil. These soils, like the Matapeake, are underlain by sandy material at a depth of about 3 feet, but their subsoil is mottled in the lower part.

The Othello soils are deep, level to very gently sloping, and poorly drained. Their surface layer is silt loam, and their subsoil is silty clay loam. In contrast to the other major soils, however, the Othello soils are gray in the surface layer and are gray to light gray and brightly mottled in the subsoil.

Also in the association are 25- to 50-acre spots of minor soils that make up 10 percent of the association. These are the well-drained Sassafras soils, which lie at higher elevations next to large streams; the moderately well drained Woodstown soils; and the poorly drained Fallsington soils, which occur farther inland from the streams.

The major soils have a high capacity for holding plant nutrients and moisture. If management is good, crops probably grow better on these soils than on any other in the county. The Matapeake soils are well suited to corn, soybeans, and other common crops. Except for slope and erodibility in small areas, these soils have practically no limitations that affect their use. Where the Mattapex soils are properly drained, they are well suited to all crops except deep-rooted perennials, such as alfalfa, that may be damaged by frost action in winter. The Mattapex soils are susceptible to erosion in a few small areas having slopes of more than 2 percent.

The Othello soils must be drained before they can be farmed. They are wet and cold in spring, and this usually delays planting until after the Matapeake and Mattapex soils are planted. After drainage is improved, the Othello soils are well suited to most crops grown in the county, but they are not suited to deep-rooted perennials that may be damaged by frost heaving.

Except in some sloping areas, where seepage and downslope pollution may be dangerous, the Matapeake soils have few limitations that affect their use for residential developments or for disposing of sewage effluent from septic tanks. Using the Mattapex and Othello soils for septic tanks is limited by a high water table in wet periods. The Mattapex soils make fairly good sites for buildings if the sites are artificially drained and if basements are sealed against penetration of water. Wetness severely limits use of the Othello soils for building sites.

3. Othello-Fallsington-Portsmouth Association

Level and nearly level, poorly drained and very poorly drained soils that have a subsoil mainly of friable or firm sandy clay loam or silty clay loam; on uplands

In this association the soils have slopes of less than 2 percent in about 98 percent of its acreage. A large part of the association was formerly farmed but has reverted to forest, and many rewooded areas are covered by almost pure stands of loblolly pine. Areas that have never been cleared are in stands of maple, holly, blackgum, and water-tolerant oaks.

This association occurs west of Quantico in the southwestern part of the county. The largest acreage is in the Green Hill area and is known as Poplar Hill Swamp. The association occupies about 12,000 acres, or 5 percent of the county.

Of the total acreage in the association, the Othello soils cover about 70 percent; the Fallsington soils, 15 percent; and the Portsmouth soils, 10 percent. The Fallsington soils generally lie at slightly higher elevations than the Othello and Portsmouth soils.

The surface layer of the Othello and Portsmouth soils is silt loam; that of the Fallsington soils is fine sandy loam or sandy loam. All of these soils have a subsoil that is mostly sandy clay loam or silty clay loam and contains gray mottles, which indicate poor drainage. All of them are underlain by sandy material at a depth of 2½ to 3 feet. In some places the soils contain fine, smooth gravel.

Also in the association are small areas of the better drained Mattapex soils, which commonly lie close to small streams, and small areas of very poorly drained Pocomoke soils. These minor soils make up about 5 percent of the association.

The major soils must be drained before they can be used intensively. If drainage is improved, the soils are well suited to corn and soybeans or can be used for many other kinds of crops. Tile drains generally function well, but ditches may be preferred in the Othello and Portsmouth soils. Trees grown for timber do satisfactorily in both drained and undrained areas. Except in a few small areas, erosion normally is not a severe hazard on the major soils of this association.

For disposing of sewage effluent from septic tanks, limitations on the use of these soils are severe. Because the water table is high during much of the year, there would be little or no movement of effluent, particularly in the Portsmouth soils. Even if drainage and sewage disposal were provided, use of the soils for homesites would be severely limited by water that would flood excavations for basements in wet periods and would injure or kill many kinds of trees, shrubs, grasses, and other plants used in landscaping.

4. Evesboro-Klej Association

Nearly level to steep, excessively drained to somewhat poorly drained sands and loamy sands; on uplands

This association consists of nearly level to steep soils that are the most sandy in the county (fig. 3). The soils have slopes of less than 2 percent in more than 70 percent of the association, but they have slopes of 2 to 5 percent in some places, and are steeper in small areas along river bluffs.

The association lies in elongated areas along the east side of the Nanticoke and Wicomico Rivers and the west side of the Pocomoke River. The city of Salisbury is on this association. Altogether, the total acreage is about 34,000 acres, or 14 percent of the county.

Most of the association near Salisbury has been cleared and is used for crops or homesites. Elsewhere, however, the association remains mostly wooded. The native vegetation is mainly scrub hardwoods and shortleaf pine in the dry areas, and it is wetland hardwoods and loblolly pine in the wetter areas.

The major soils in the association are the Evesboro and the Klej. About 35 percent of the acreage is Evesboro soils, and 30 percent is Klej soils.

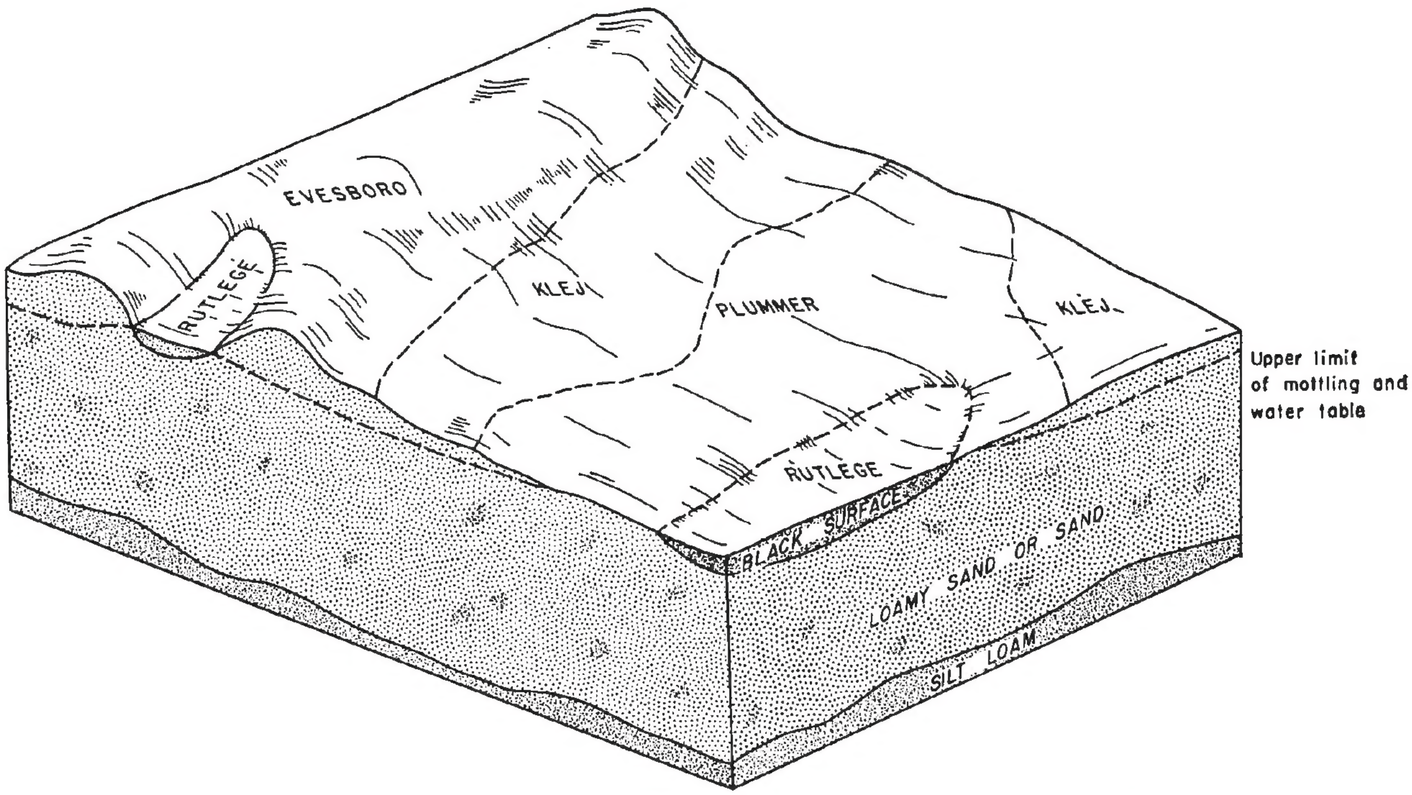

Figure 3.—**Cross section showing typical soil pattern in the Evesboro-Klej association.**

Evesboro soils are somewhat excessively drained or excessively drained sands and loamy sands. They are grayish brown in the surface layer and are pale brown to light yellowish brown in the material just beneath it. In most places the Evesboro soils in this county are underlain by moderately fine textured material at a depth of more than 5 feet.

The Klej soils developed in the same kind of material as the Evesboro, but they are somewhat poorly drained or moderately well drained.

Also in the association are areas of the somewhat excessively drained or excessively drained Galestown soils and the poorly drained, mottled, gray or grayish Plummer soils. The Galestown make up about 15 percent of the association, and the Plummer, 10 percent. In addition, there is a small acreage of Downer, Fallsington, Pocomoke, and Rutlege soils.

The major soils are low in natural fertility and in capacity to hold moisture available to plants. Moreover, drainage generally is needed on the Klej soils, particularly for disposing of excess surface water from the more nearly level soils during planting and the early part of the growing season. Nevertheless, some areas of the major soils are used for crops, principally watermelons, cucumbers, peppers, and sweetpotatoes. If the soils are well managed, they are generally well suited to practically all crops grown in the county, but full production can be obtained only by making liberal use of fertilizer and manure, by irrigating during dry periods, and by protecting the soils from erosion, particularly wind damage.

The Evesboro soils of this association are suitable for use as building sites and for the disposal of sewage effluent from septic tanks, but pollution is a hazard in places where the soils are sloping. The Klej soils are of limited use for septic tanks because the water table is high in wet periods. For residential developments, however, the Klej soils have few or no limitations if the building sites are drained.

5. Elkton-Matawan-Bayboro Association

Level to gently sloping, very poorly drained to moderately well drained soils that have a subsoil of plastic silty clay, sandy clay loam, or sandy clay; on uplands

The soils in almost all of this association are level or nearly level (fig. 4). At least 90 percent of the acreage has slopes of less than 2 percent, and most of the rest has slopes of 2 to 5 percent. Most of the association was cleared and farmed in the past, but woodland is now extensive. Maple, holly, oak, and gum are the principal trees in areas that have never been cleared. Loblolly pine has invaded reforested fields, however, and shortleaf pine covers the sandhills.

The association forms an irregularly shaped belt that extends from the Delaware line, east of Delmar, southward to the Worcester County line. Altogether, the association occupies about 27,000 acres, or 11 percent of the county.

Of the total area, the Elkton soils make up about 56 percent; the Matawan soils, 20 percent; and the Bayboro soils, 10 percent. The level or nearly level Elkton soils are poorly drained. They have a gray surface layer of loam,

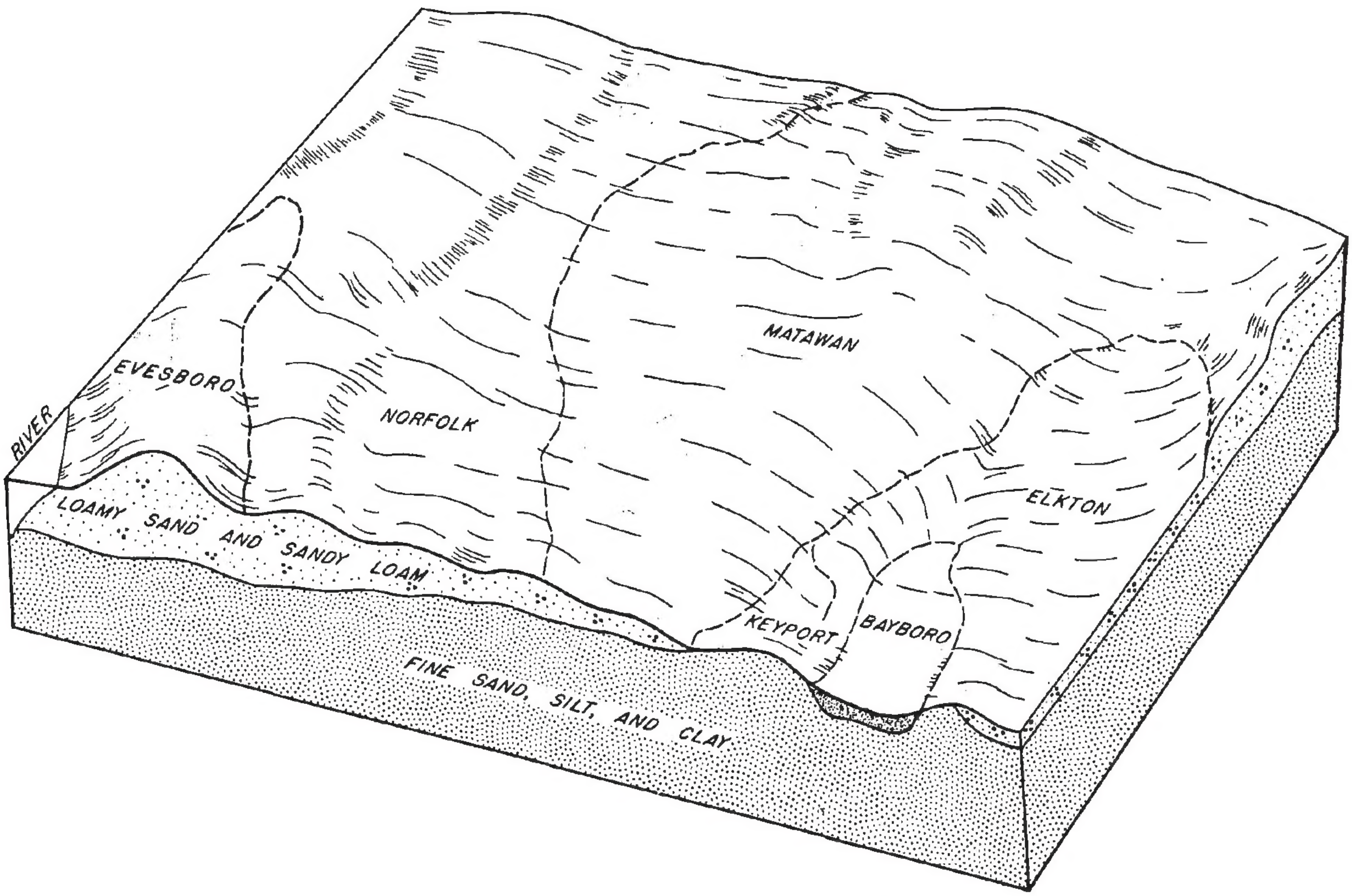

***Figure 4.*—Cross section showing typical soil patterns in the Elkton-Matawan-Bayboro and Matawan-Norfolk associations.**

sandy loam, or silt loam and a subsoil chiefly of gray, strongly mottled silty clay that is plastic when wet. Underlying the subsoil is material ranging from sand to silty clay.

The Matawan soils are more sandy than the Elkton soils; they have a surface layer of sandy loam, fine sandy loam, or loamy sand and a subsoil mainly of sandy clay loam. Matawan soils are moderately well drained in most places, and they tend to dry out sooner and can be planted earlier in spring than the Elkton soils. A few areas of the Matawan soils are sloping to steep.

The Bayboro soils developed in the same kind of material as the Elkton soils, but they are very poorly drained and their surface layer is black or nearly black instead of gray.

Among the minor soils in the association are the Portsmouth soils, which account for 6 percent of the acreage. The remaining 8 percent is occupied by the Klej and Evesboro soils.

The Elkton and Bayboro soils must be drained before they can be farmed. Because they are level or nearly level and are slowly permeable in the subsoil, they require ditching for the removal of excess water. Where drainage is adequate, these soils are suited to many kinds of crops but are most commonly used for corn and soybeans.

The Matawan soils are subject to erosion, mainly by water. Soil blowing also is a hazard in large, unprotected fields.

All the major soils of this association have characteristics that limit their use for disposing of sewage effluent from septic tanks. In the Elkton and Bayboro soils, the water table is high for a large part of the year, and there would be little or no movement of effluent. Even if drainage and sewage disposal were provided, the Bayboro and Elkton soils have limitations that restrict their use for homesites or residential developments. The Matawan soils are suitable for residential developments, but a high water table limits use of these soils for septic tanks in very wet periods.

6. Pocomoke-Fallsington Association

Level and nearly level, very poorly drained and poorly drained soils that have a subsoil of friable sandy clay loam; on uplands

This association occupies upland flats and slightly depressional areas (fig. 5). The soils are level or nearly level. In less than 4 percent of the acreage slopes are as much as 2 percent. About two-thirds of the association is woodland.

Figure 5.—**Aerial view of the Pocomoke-Fallsington association near Willards. Pocomoke soils are in the dark-colored areas, and Fallsington soils are in most of the lighter colored areas.**

Maple, gum, and water-tolerant oaks are the principal trees in uncut stands; loblolly pine covers areas that have been cut over and then reforested; and a few pond pines grow in the wettest spots.

This association is the most extensive one in the county. The largest area lies west of Willards and Powellville in the eastern part, and smaller areas are scattered in the western and southern parts. The association occupies about 56,000 acres, or 23 percent of the county.

Of the total acreage in the association, the Pocomoke soils make up about 45 percent, and the Fallsington soils, 40 percent. The surface layer of the very poorly drained Pocomoke soils is black or nearly black loam or sandy loam, and that of the poorly drained Fallsington soils is gray loam, sandy loam, or fine sandy loam. These soils all have a subsoil of gray, mottled sandy clay loam that is friable in most places. They are underlain by much sandier material at a depth of 2 to 3 feet.

The remaining 15 percent of the acreage is covered by minor soils. These are the Evesboro, Klej, Leon, and St. Johns soils in the eastern part of the county and the Woodstown Othello, and Portsmouth soils in the western part.

The major soils in this association, as well as all the minor ones except the Evesboro, must be drained before they can be farmed. To improve drainage in the Pocomoke and Fallsington soils, either tiling or ditching can be used if outlets are adequate. In drained areas these soils are easily managed and are commonly used for corn and soybeans. Crops grow well if fertility is maintained. The major soils normally are not subject to erosion, but they tend to cave into ditches that have been newly constructed for improving drainage.

Even if drainage is provided, wetness limits use of the soils in this association for residential developments and for disposing of sewage effluent from septic tanks. Almost all buildings constructed in areas of the association are located on slight knolls, which consist of minor soils that have adequate drainage.

7. Muck Association

Level, very poorly drained, organic soils on river flats that are subject to flooding by fresh water

This association occupies flats along the western side of the Pocomoke River and at the headwaters of Nassawango Creek. All of the association is forested, mostly with maple, gum, and bay. In addition, there are a few baldcypress trees. The association covers about 5,500 acres, or 2 percent of the county.

About 95 percent of the association is Muck. These organic soils developed in the well-decomposed remains of plant materials mixed with mineral sediments. The surface layer is black or nearly black, and it is underlain by black organic material that extends to a depth of as much as 19 feet. Underlying this material in most places is sandy material.

The Pocomoke, Rutlege, and Portsmouth soils are minor soils that occupy the other 5 percent of the acreage.

Muck soils are very wet and extremely acid, and they shrink and subside as they dry. The soils are not farmed in this county, but they supply a small amount of timber, as well as food and shelter for wildlife.

Using these soils for residential developments is severely limited because the organic material is very poor for foundations. Also, the septic tanks commonly used in the county would not function in these soils.

8. Tidal Marsh Association

Areas that are subject to flooding by salt water from estuaries

This association consists almost entirely of the tidal marshland in Wicomico County. The association accounts for about 7 percent of the county, or 16,500 acres. Of this total, a small part is occupied by Beaches, and there are small areas of Othello and Fallsington soils.

Except for the minor soils, this association is too wet and too brackish for farming. It provides food and cover for wildlife and can be used for fishing, boating, and hunting. Unless the association is reclaimed, it is not suitable for commercial, industrial, or residential uses, but reclamation and improvement generally are not feasible.

9. Matawan-Norfolk Association

Level to gently sloping, moderately well drained and well drained soils that have a subsoil of friable or firm sandy clay loam; on uplands

In this association are broad areas of deep, level to gently sloping, mainly sandy soils. (See fig. 4, p. 6.) The soils are level or nearly level in about 85 percent of the association and have slopes of 2 to 5 percent in most of the rest. About 5 percent consists of small areas where slopes are between 5 and 30 percent. Although some areas remain wooded, most of the acreage has been cleared and is used for crops or homesites (fig. 6). The native vegetation is loblolly pine, several kinds of oak, a few scattered gum trees, and an understory of bay. Loblolly pine is especially prominent in second-growth stands.

The association occurs in the central part of the county, where it lies in a large area that is roughly horseshoe

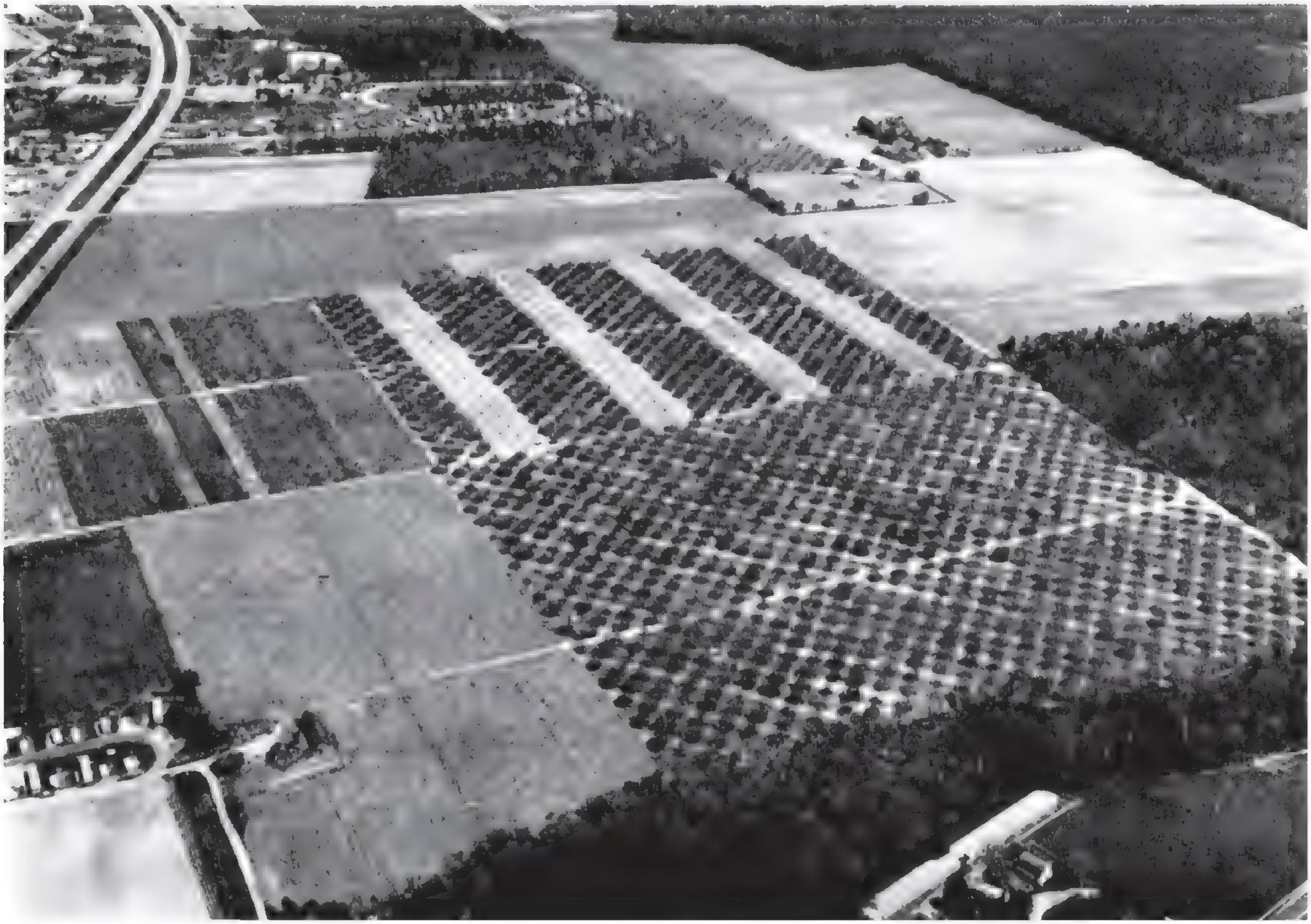

Figure 6.—**Aerial view of a typical landscape in the Matawan-Norfolk association, about 2 miles north of Salisbury on U.S. Highway 13. The apple orchard in foreground is mostly on Norfolk loamy sand, 0 to 2 percent slopes.**

shaped. It covers about 44,000 acres, or 18 percent of the county.

About 50 percent of the association is Matawan soils, and 35 percent is Norfolk soils. The moderately well drained Matawan soils developed in thick, sandy deposits underlain by finer textured material. They have a surface layer of loamy sand, sandy loam, or fine sandy loam. The well-drained Norfolk soils developed in thick beds of sandy material containing small amounts of clay and silt. Their surface layer is loamy sand. Soils of both series have a subsoil chiefly of sandy clay loam.

Also in the association, on meandering ridges, are small areas of excessively drained Evesboro soils, and these make up about 5 percent of the association. Slightly depressional areas of poorly drained Elkton soils occupy about 5 percent of the acreage. In addition, there are small, scattered areas of well drained Sassafras soils and moderately well drained Klej and Keyport soils.

The major soils of this association are fairly low in productivity and in capacity to hold moisture available to plants. Nevertheless, most of the truck crops produced in the county are grown on these soils. Normally, corn and soybeans do well. The soils generally are well suited to nearly all the common crops, but full production can be obtained only under intensive management, including the liberal use of fertilizer and manure. Also needed is protection from soil blowing and water erosion. Supplemental irrigation is of benefit to crops in dry periods.

The Norfolk soils have few or no limitations that affect their use for disposal of sewage effluent from septic tanks. In the Matawan soils, however, such use is limited by a high water table during wet periods. In other respects the Matawan and Norfolk soils have few or no limitations as sites for residential developments.

Descriptions of the Soils

This section describes the soil series and mapping units of Wicomico County. The acreage and proportionate extent of each mapping unit are given in table 1.

The procedure in this section is first to describe the soil series, and then the mapping units in that series. For

each soil series, a profile of a soil representative of the series is described. Thus, to get full information on any one mapping unit, it is necessary to read the description of the soil series to which it belongs.

As mentioned in the section "How This Survey Was Made," not all mapping units are members of a soil series. Beaches, Borrow pits, and Made land, for example, do not belong to a soil series, but, nevertheless, are listed in alphabetical order along with the soil series.

Following the name of each mapping unit, there is a symbol in parentheses. This symbol identifies the mapping unit on the detailed soil map. Listed at the end of each description is the capability unit and the woodland suitability group in which the mapping unit has been placed. The pages on which each capability unit and each woodland group are described can be found by referring to the "Guide to Mapping Units" at the back of the soil survey.

TABLE 1.—*Approximate acreage and proportionate extent of the soils*

Soil	Acres	Percent	Soil	Acres	Percent
Bayboro loam	2,295	0.9	Matawan loamy sand, 0 to 2 percent slopes	10,297	4.2
Bayboro silt loam	320	.1	Matawan loamy sand, 2 to 5 percent slopes	2,335	1.0
Beaches	199	.1	Matawan loamy sand, 5 to 10 percent slopes	315	.1
Borrow pits	130	.1	Matawan loamy sand, 10 to 30 percent slopes	173	.1
Downer loamy sand, 0 to 2 percent slopes	2,151	.9	Matawan sandy loam, 0 to 2 percent slopes	9,491	3.9
Downer loamy sand, 2 to 5 percent slopes, moderately eroded	3,134	1.3	Matawan sandy loam, 2 to 5 percent slopes	1,256	.5
Downer loamy sand, 5 to 10 percent slopes	237	.1	Mattapex loam, 0 to 2 percent slopes	428	.2
Elkton loam	3,585	1.5	Mattapex loam, 2 to 5 percent slopes	140	.1
Elkton sandy loam	10,581	4.3	Mattapex silt loam, 0 to 2 percent slopes	2,045	.8
Elkton silt loam	697	.3	Mattapex silt loam, 2 to 5 percent slopes	386	.2
Elkton silty clay loam	52	(1)	Mixed alluvial land	4,483	1.8
Evesboro loamy sand, 5 to 15 percent slopes	2,069	.9	Muck	5,476	2.2
Evesboro loamy sand, clayey substratum, 0 to 5 percent slopes	8,880	3.6	Norfolk loamy sand, 0 to 2 percent slopes	11,033	4.5
Evesboro sand, 5 to 15 percent slopes	1,824	.7	Norfolk loamy sand, 2 to 5 percent slopes	3,101	1.3
Evesboro sand, clayey substratum, 0 to 5 percent slopes	4,629	1.9	Norfolk loamy sand, 5 to 10 percent slopes	503	.2
Evesboro soils, 15 to 40 percent slopes	238	.1	Norfolk and Sassafras soils, 10 to 15 percent slopes	463	.2
Evesboro-Galestown sands, 5 to 15 percent slopes	2,392	1.0	Norfolk and Sassafras soils, 15 to 30 percent slopes	345	.1
Evesboro-Galestown sands, clayey substratum, 0 to 5 percent slopes	1,882	.8	Othello silt loam	17,232	7.1
Evesboro-Galestown-Downer loamy sands, 0 to 10 percent slopes	933	.4	Othello silt loam, low	551	.2
Fallsington fine sandy loam	4,447	1.8	Plummer loamy sand	6,004	2.5
Fallsington loam	2,339	1.0	Pocomoke loam	12,275	5.0
Fallsington sandy loam	20,886	8.6	Pocomoke sandy loam	14,939	6.1
Galestown loamy sand, 5 to 15 percent slopes	592	.2	Portsmouth sandy loam	1,622	.7
Galestown loamy sand, clayey substratum, 0 to 5 percent slopes	6,401	2.6	Portsmouth silt loam	941	.4
Keyport silt loam, 0 to 2 percent slopes	269	.1	Rutlege loamy sand	2,580	1.2
Keyport silt loam, 2 to 5 percent slopes	93	(1)	Sassafras fine sandy loam, 0 to 2 percent slopes	614	.3
Klej loamy sand, 0 to 2 percent slopes	11,424	4.7	Sassafras fine sandy loam, 2 to 5 percent slopes	512	.2
Klej loamy sand, 2 to 5 percent slopes	2,856	1.2	Sassafras sandy loam, 0 to 2 percent slopes	2,741	1.1
Leon loamy sand	1,080	.4	Sassafras sandy loam, 2 to 5 percent slopes, moderately eroded	1,919	.8
Made land	687	.3	Sassafras sandy loam, 5 to 10 percent slopes, moderately eroded	181	.1
Matapeake fine sandy loam, 0 to 2 percent slopes	244	.1	St. Johns loamy sand	1,971	.8
Matapeake fine sandy loam, 2 to 5 percent slopes, moderately eroded	240	.1	St. Johns mucky loamy sand	336	.1
Matapeake silt loam, 0 to 2 percent slopes	1,153	.5	Swamp	90	(1)
Matapeake silt loam, 2 to 5 percent slopes, moderately eroded	874	.4	Tidal marsh	14,184	5.8
Matapeake silt loam, 5 to 10 percent slopes	219	.1	Woodstown fine sandy loam, 0 to 2 percent slopes	1,619	.7
Matawan fine sandy loam, 0 to 2 percent slopes	2,209	.9	Woodstown fine sandy loam, 2 to 5 percent slopes	498	.2
Matawan fine sandy loam, 2 to 5 percent slopes	233	.1	Woodstown loam, 0 to 2 percent slopes	262	.1
			Woodstown sandy loam, 0 to 2 percent slopes	6,290	2.6
			Woodstown sandy loam, 2 to 5 percent slopes	1,095	.4
			Total	243,200	100.0

[1] Less than 0.05 percent.

The color of each soil horizon is described in words, such as yellowish brown, but it can also be indicated by symbols for the hue, value, and chroma, such as 10YR 5/6. These symbols, called Munsell color notations (*9*),[1] are used by soil scientists to evaluate the color of the soil precisely. Unless otherwise indicated, the colors given in the following descriptions are for the soils when moist.

The depth to bedrock is not given in these descriptions, because all the soils in Wicomico County are underlain by unconsolidated materials of great thickness, and depth to bedrock is not important in identifying the various kinds of soils in this county.

Many terms used in the soil descriptions and other sections of the survey are defined in the Glossary.

Bayboro Series

The Bayboro series is made up of very poorly drained soils that have a fine-textured subsoil. These soils lie on upland flats and in depressions, where they developed in thick beds of clay, fine silty clay, or fine sandy clay. They occur in scattered areas south of Parsonsburg and west of Wango in the eastern half of the county. In native woodland the trees are mainly water-tolerant oaks, gums, red maple, holly, and pond and loblolly pines. Also, there is commonly a dense understory of greenbrier and various kinds of shrubs. In cultivated fields the Bayboro soils appear as dark, rounded areas of 4 to 60 acres that are crossed by many ditches.

A typical profile has a black loam surface layer about 10 inches thick that is slightly sticky and slightly plastic when wet. The subsoil, to a depth of about 28 inches, is gray to light brownish-gray fine sandy clay that is mottled with yellowish brown and strong brown. This layer, when wet, is sticky and plastic. The lower part of the subsoil is light olive-gray fine sandy clay extending to a depth of about 38 inches. Below that depth the material is light-gray sandy clay loam in the upper part and is light-gray, loose loamy sand at a depth of about 55 inches.

The Bayboro soils are very strongly acid or extremely acid unless they have been limed. In undrained areas they have a high water table and are covered by water for much of the winter. They warm up very slowly in spring. Nevertheless, these soils have high available moisture capacity, are moderate in natural fertility, and if they are adequately drained, are suited to general farm crops. Undrained areas are suitable for pasture, woodland, and wildlife habitat.

Profile of Bayboro loam, in a wooded area about 1 mile west of Shavox:

O1—2 to 1 inch, litter from hardwoods and pines.

O2—1 inch to 0, mat of partially decomposed organic material mixed with some mineral material; many fine roots.

A1—0 to 10 inches, black (10YR 2/1) loam that is high in organic-matter content; weak, medium and coarse, granular structure; friable when moist, slightly plastic and slightly sticky when wet; many fibrous and a few woody roots; very strongly acid; abrupt, wavy boundary. Horizon is 6 to 12 inches thick.

B1g—10 to 16 inches, light brownish-gray (2.5Y 6/2) light sandy clay (sand particles are fine); a few, medium, distinct mottles of yellowish brown (10YR 5/6); moderate, medium, prismatic structure and weak, medium and coarse, blocky structure; firm when moist, plastic and sticky when wet; a few fibrous and very few woody roots; some distinct, gray (5Y 5/1) coatings of silt or clay; very strongly acid; clear, wavy boundary. Horizon is 3 to 8 inches thick.

B21tg—16 to 28 inches, gray or light-gray (10YR 6/1) heavy sandy clay (sand particles are fine); common, coarse, prominent mottles of strong brown (7.5YR 5/6); moderate, medium and coarse, prismatic and blocky structure; very firm when moist, plastic and sticky when wet; very few roots; some gray (5Y 5/1), distinct clay coats; very strongly acid; clear, wavy boundary. Horizon is 8 to 15 inches thick.

B22tg—28 to 38 inches, light olive-gray (5Y 6/2) fine sandy clay; many, coarse, prominent mottles of brownish yellow (10YR 6/6); weak, fine and medium, subangular blocky structure; firm when moist, plastic and sticky when wet; very few roots; some gray (5Y 5/1), distinct clay coats; extremely acid; clear, wavy boundary. Horizon is 7 to 13 inches thick.

C1g—38 to 55 inches, light-gray (5Y 7/1) light sandy clay loam (sand particles are fine); a few, medium, prominent mottles of yellowish brown (10YR 5/6); structureless (massive) to very weak, fine, subangular blocky structure; firm when moist, plastic and slightly sticky when wet; a very few fine roots; extremely acid; gradual to clear, wavy boundary. Horizon is 15 to 20 inches thick.

IIC2g—55 to 63 inches +, light-gray (5Y 7/1), loose, structureless loamy sand; no roots; very strongly acid.

The A horizon generally is loam, but in some areas it is silt loam. In places where this horizon is silt loam, the solum is less sandy throughout than the one described in the typical profile and the B2t horizon is clay or silty clay. Also in these places, the C1g horizon is clay or silty clay and the IIC2g horizon may not occur within a 5-foot depth. In wooded areas of Bayboro loam, the A horizon generally contains visible grains of white sand. Where the soils are cultivated, the A horizon commonly is very dark gray (N 3/0), and the B2t horizon shows few to common, distinct to prominent mottles of strong brown (7.5YR 5/6 to 5/8). The C horizon is white (5YR 8/1) in some places, and it may be mottled. Locally, old root channels are filled with organic matter to some depth. The solum ranges from 24 to 40 inches in thickness.

The Bayboro soils developed in the same or nearly the same kind of material as the Keyport and Elkton soils, but they are more poorly drained and have a darker colored A horizon than those soils. Bayboro soils resemble the Pocomoke and Portsmouth soils in morphology and drainage, but they are distinctly less sandy throughout than the Pocomoke soils, and they contain distinctly less silt than the Portsmouth soils, particularly in their B2t horizon.

Bayboro loam (Ba).—This nearly level soil has the profile described as typical for the series. In some wooded areas its surface layer is rather mucky and is as much as 24 inches thick. Included with this soil in mapping are small areas where the surface layer is gray, and small spots in which the subsoil is coarser textured and less sticky than the typical one. Also included are local areas that have a somewhat sandy surface layer. This very poorly drained soil (fig. 7) is difficult to drain and, even with adequate drainage, may be difficult to manage. Under good management the soil can be used for corn or soybeans. (Capability unit IIIw-9; woodland suitability group 1)

Bayboro silt loam (Bb).—The profile of this nearly level soil contains less sand than that described as typical for the series. The surface layer is sticky when wet and, when moist, appears blacker than that of Bayboro loam. The subsoil and generally the substratum are very sticky clay or silty clay. Included with this soil in mapping are small areas where the surface layer is slightly sandy and a few spots in which the subsoil is coarser textured and less sticky than the one just described.

[1] Italic numbers in parentheses refer to Literature Cited, p. 88.

Figure 7.—**Adequate drainage is needed in this field of Bayboro loam. Heavy rain that fell here early in March delayed the completion of plowing for a month.**

Draining this soil is difficult because water moves slowly in it, particularly in the subsoil. If the soil is cleared and drained, it is farmed much like Bayboro loam, but it stays wet longer than that soil and is less easily worked. (Capability unit IIIw–9; woodland suitability group 1)

Beaches

Beaches (Be) are measurable sandy areas along the Nanticoke and Wicomico Rivers, especially near Tangier Sound. They consist of incoherent loose sand that has been worked and reworked by waves and tides and by winds, and that likely will be reworked again. In some places the Beaches are level to gently sloping and have a smooth surface, but in others they are somewhat hummocky or dunelike and have short slopes. The sand shows no soil development and supports little if any vegetation. American beachgrass and beach goldenrod grow in some places, and there are a few clumps of switchgrass. Pine trees and a few shrubs occur on partly stabilized areas.

Beaches are of no value for farming. (Capability unit VIIIs–2; woodland suitability group 20)

Borrow Pits

Borrow pits (Bo) are areas from which the soil has been completely removed, mainly for use as fill material in road construction and for other purposes. After removal of the soil, the floor of the pits ranges from sand to clay and in some places is gravelly. Some pits contain water part or all of the year.

Borrow pits are not used for farming, but in some areas there are naturally occurring or planted trees, generally pines, that may produce some woodland products. The pits are so variable that each area must be examined before its suitability can be determined. Some of them could be used as ponds for farm water, wildlife, and recreation. (Capability unit VIIIs–4; woodland suitability group 21)

Downer Series

The Downer series consists of deep, well-drained, sandy, brown soils of the uplands. These level to sloping soils developed in thick beds of sandy marine sediments and very old river sediments. They commonly occur near the Nanticoke River in the western part of the county. Where the soils are wooded, the native trees are mostly oaks and other hardwoods, but in small areas loblolly pine is abundant in cutover and second-growth stands. Cultivated areas of Downer soils appear as grayish-brown sandy fields unbroken by drainage ditches.

In a typical profile the surface layer is dark grayish-brown loamy sand about 8 inches thick. Just below is a subsurface layer of yellowish-brown, crumbly loamy sand. The subsoil, between the depths of 18 and 35 inches, is brown, yellowish-brown, or dark-brown sandy loam that is crumbly but is slightly sticky when wet. It is underlain by loose, pale-brown loamy sand that extends to a depth of 52 inches or more.

In Wicomico County the Downer soils are used for farming on about three-fourths of their total acreage. These soils are easily penetrated by roots, air, and water; they warm up early in spring; and they can be worked throughout a wide range of moisture content. Consequently, they are well suited to truck crops. The Downer soils are naturally acid and have moderate capacity for holding nutrients and moisture available to plants. Lime and a large amount of fertilizer are needed for most crops. Vegetables or fruits produced in early spring gardens are well suited to these soils. All crops benefit from irrigation during the drier part of the cropping season.

Profile of Downer loamy sand, 0 to 2 percent slopes, in a level cultivated area about 3½ miles southeast of Sharptown:

Ap—0 to 8 inches, dark grayish-brown (10YR 4/2) loamy sand; structureless (single grain); very friable; roots plentiful; neutral (limed); abrupt, smooth boundary. Horizon is 6 to 10 inches thick.

A2—8 to 18 inches, yellowish-brown (10YR 5/4) loamy sand; very weak, coarse, granular structure; very friable; few roots; slightly acid; clear, smooth boundary. Horizon is 6 to 14 inches thick.

B1—18 to 22 inches, yellowish-brown (10YR 5/4) to brown (7.5YR 5/4) sandy loam; weak, fine to medium, subangular blocky structure; friable when moist, slightly plastic and slightly sticky when wet; few roots; slightly acid; clear, smooth boundary. Horizon is 2 to 5 inches thick.

B2t—22 to 28 inches, brown or dark-brown (7.5YR 4/4) heavy sandy loam; weak, fine to medium, subangular blocky structure; friable when moist, sticky and slightly plastic when wet; very few roots; distinct clay bridges and some faint clay coats; strongly acid; abrupt, smooth boundary. Horizon is 5 to 10 inches thick.

B3—28 to 35 inches, brown or dark-brown (7.5YR 4/4) sandy loam; very weak, fine to medium, subangular blocky structure; very friable when moist, slightly sticky when wet; no roots; very strongly acid; gradual, smooth boundary. Horizon is 5 to 11 inches thick.

C—35 to 52 inches +, pale-brown (10YR 6/3) loamy sand that is faintly variegated with light yellowish brown (2.5Y 6/4); structureless (single grain); loose; no roots; strongly acid.

The texture of the B2t horizon is sandy loam, fine sandy loam, or light sandy clay loam. The C horizon is mainly sand or loamy sand, but in places it includes sandy loam in lenses ½ to 1 inch thick. In undisturbed wooded areas there is a thin, generally dark-gray (10YR 4/1) A1 horizon. In some places the A2 horizon is light yellowish brown (2.5YR 6/4), and

in many places the B2t horizon has a value of 5 and a chroma of 6 or 8. The color of the C horizon may be uniformly pale brown (10YR 6/3) or yellowish brown (10YR 5/6 or 5/8), or it may be variegated with either yellower or redder hues. The solum ranges from 24 to 36 inches in thickness.

The Downer soils are similar to the Sassafras and Galestown soils in color, but they have a coarser textured solum than the Sassafras soils and are not so coarse textured in the B2t horizon as the Galestown soils. Downer soils are not so yellow in the subsoil as the Norfolk soils, and their B2t horizon is distinctly thinner than the one in those soils. Compared with the Matawan soils, the Downer soils have a thinner A horizon, are less yellow in the profile, and lack mottling in the lower part of the B horizon.

Downer loamy sand, 0 to 2 percent slopes (DoA).—This soil commonly occurs in fairly large areas. It has the profile described as typical for the Downer series.

The use of this soil is somewhat limited by sandiness, and special practices are needed for maintaining fertility. If the soil is carefully managed, however, it is well suited to corn, soybeans, watermelons, cucumbers, and sweetpotatoes. (Capability unit IIs-4; woodland suitability group 7)

Downer loamy sand, 2 to 5 percent slopes, moderately eroded (DoB2).—This soil occupies fairly large areas and is the most extensive Downer soil in the county. Except that its surface layer has been thinned by erosion, its profile is similar to the one described as typical for the series. Most of the soil lost has been washed away, but in some places there has been wind damage.

In managing this soil, sandiness is of greater concern than the erosion hazard. Soil losses can be checked if fairly simple measures are used. (Capability unit IIs-4; woodland suitability group 7)

Downer loamy sand, 5 to 10 percent slopes (DoC).—This soil occurs chiefly on small ridges and is in areas scattered throughout the county. If left exposed, the soil washes easily and, in some places, is subject to blowing.

This soil is suited to most crops, but little of it is farmed, except where it occurs within large fields of other soils that are cultivated. It can be cropped regularly if it is kept fertile and protected from erosion. (Capability unit IIIe-33; woodland suitability group 8)

Elkton Series

The Elkton series consists of deep, poorly drained soils having a gray, mottled, fine-textured subsoil that is slowly to very slowly permeable. These soils occur on uplands, where they developed in beds of clay, silty clay, or somewhat sandy clay underlain by sandy deposits. In Wicomico County the Elkton soils generally have been covered by a thin mantle of sandy material. The native vegetation is chiefly a mixture of wetland hardwoods, including swamp maple, bay, holly, and many kinds of oaks. Loblolly pine is common in areas that have been cut over or previously cleared.

In a typical profile the surface layer is dark-gray sandy loam about 7 inches thick. The upper part of the subsoil, to a depth of about 13 inches, is pale-olive fine sandy clay that is plastic and sticky when wet. The lower part of the subsoil extends to a depth of about 31 inches. It is gray or light-gray silty clay or clay loam that is mottled with brownish yellow to yellowish red and is sticky or very sticky when wet. Underlying the subsoil is massive, white, sticky silt loam that also is mottled.

The Elkton soils are extensive in Wicomico County. They have a seasonally high water table, and unless their drainage is improved, they may be covered by water during the wet part of the year. They are subject to frost action and are slow to warm up in spring. Water moves slowly through their fine-textured subsoil, and the soils are difficult to work because they are sticky when wet. Nevertheless, more than half their acreage has been cleared and drained and is used for corn, soybeans, and other crops. The soils have high available moisture capacity but only moderate natural fertility, and large amounts of lime and fertilizer are needed for a good growth of crops. Undrained areas generally are used as woodland and wildlife habitat.

Profile of Elkton sandy loam, in a recently rewooded area on Colbourne Mill Road, 4½ miles southeast of Salisbury:

O1—2 to 1 inch, litter of loblolly needles, partly decomposed.

O2—1 inch to 0, mat of partially decomposed organic material mixed with some mineral material; many fine roots.

Ap—0 to 7 inches, dark-gray (10YR 4/1) sandy loam; weak, medium to coarse, granular structure; friable when moist, slightly plastic and slightly sticky when wet; roots plentiful; medium acid (limed in recent past); abrupt, smooth boundary. Horizon is 6 to 8 inches thick.

B1—7 to 13 inches, pale-olive (5Y 6/3) light fine sandy clay; common, fine, faint mottles of olive yellow (2.5Y 6/6); weak, fine to medium, granular structure; firm when moist, plastic and sticky when wet; few roots; roots and gray silt coatings in old cracks; strongly acid; clear, smooth boundary. Horizon is 5 to 8 inches thick.

B21tg—13 to 24 inches, gray or light-gray (5Y 6/1) silty clay; common, medium, distinct mottles of brownish yellow (10YR 6/6) and few, medium, prominent mottles of strong brown (7.5YR 5/8); moderate, fine to coarse, blocky structure; very firm when moist, plastic and very sticky when wet; few roots; distinct continuous clay coatings; very strongly acid; clear, wavy boundary. Horizon is 10 to 14 inches thick.

B22tg—24 to 31 inches, light-gray (5Y 7/1) heavy clay loam or slightly gritty silty clay; common, fine, prominent mottles of brownish yellow (10YR 6/8) and a few, fine, prominent mottles of yellowish red (5Y 4/6); weak to moderate, fine to coarse, blocky structure; very firm when moist, plastic and sticky when wet; very few roots; faint discontinuous clay coatings; extremely acid; abrupt, wavy boundary. Horizon is 6 to 10 inches thick.

Cg—31 to 60 inches, white (5Y 8/1) heavy silt loam; a few, fine, prominent mottles of strong brown (7.5YR 5/8) and common, coarse, faint mottles of pale yellow (5Y 7/3); mostly structureless (massive) but includes some very weak, fine, subangular blocks; firm when moist, plastic and sticky when wet; no roots; extremely acid.

The A horizon is loam in places where the surface was covered by only a small amount of sandy material, which was subsequently mixed with underlying soil material. In areas lacking a cover of sandy material, this horizon is silt loam or, in small areas, silty clay loam.

The hue throughout the profile is 10YR or yellower, including neutral. Where the soils are undisturbed, the A1 horizon has a value of 3 or 4 and a chroma of 0 to 2. In all other horizons the value of the matrix is 4 to 8, and the chroma is 0 to 2 or, in a few places, 3. Mottles in the B horizon range from faint to prominent; their hue is 7.5YR or yellower, and their chroma is mostly 4 to 8. In unlimed areas the profile generally is strongly acid to extremely acid, but it is less acid in some places where the C horizon is sandy. A sandy C horizon occurs most commonly at elevations near sea level. Locally, old root channels are stained or filled with organic material to a great depth.

The Elkton soils developed in the same kind of material as the moderately well drained Keyport soils and the very poorly

drained Bayboro soils. Elkton soils are similar to the Fallsington and Othello soils in morphology and drainage, but they have a Bt horizon that is much less readily permeable than that of the Fallsington soils, and they contain much less silt throughout than the Othello soils, which have a Bt horizon of silty clay loam.

Elkton loam (Ea).—This soil generally is level or nearly level, but in scattered areas it has slopes of slightly more than 2 percent. Included in mapping are small areas in which the surface layer is black and some spots in which the subsoil, when wet, is less sticky than normal.

This soil warms up more slowly in spring and is a little harder to work than Elkton sandy loam. Generally, there is little or no hazard of erosion. (Capability unit IIIw-9; woodland suitability group 1)

Elkton sandy loam (Ek).—This soil has the profile described as typical for the series. Most of the soil is level or nearly level, but in scattered areas the slope is a little more than 2 percent. In addition, the slope is 5 percent or more in a few areas, and spots of these are seriously eroded.

This soil is a little more gritty than other Elkton soils. In some places the surface layer is thicker than the typical one, and locally it is almost black. The underlying material commonly is very sandy and may occur at a depth of about 4 feet.

Although the subsoil of this soil is only slowly permeable to water, Elkton sandy loam is more easily drained than other Elkton soils in the county. Also, it warms up earlier in the spring and is more easily farmed. If the soil is well managed, it is suited to corn and soybeans. (Capability unit IIIw-11; woodland suitability group 1)

Elkton silt loam (Em).—This inextensive soil is so nearly level that it is subject to little or no erosion. The profile of this soil is similar to that described as typical for the series in most respects, but its surface layer consists mostly of silt and contains very little sand.

This soil is used and managed in much the same way as Elkton loam, but it dries somewhat more slowly and is slightly less easy to work. Plowing is difficult if the soil is dry, and dried clods are difficult to break up in seedbed preparation. The surface tends to seal over as it dries, and this may result in poor emergence and thin stands of corn and soybeans. These crops grow well, however, if the soil is drained, limed, well fertilized, and carefully tilled. Pasture and wetland trees also are well suited to this soil. (Capability unit IIIw-9; woodland suitability group 1)

Elkton silty clay loam (En).—This soil is level and is not likely to erode, but it is difficult to drain and warms up very slowly in spring. The surface layer of silty clay loam is stickier when wet than that of any other Elkton soil in the county. Plowing is difficult if the soil is either too wet or too dry. The clayey subsoil commonly extends to a depth of more than 5 feet.

Most of this soil is covered with trees. Pasture or woodland is a more suitable use than cultivated crops. (Capability unit VIw-2; woodland suitability group 10)

Evesboro Series

Soils of the Evesboro series are nearly level to steep, sandy, and somewhat excessively drained or excessively drained. They occur mainly on upland deposits of sand, some of which are dunelike. Evesboro soils formed in beds of sandy marine sediments or very old river sediments, generally underlain by finer textured material. Most of their acreage is in the Pittsville to Wango area in the eastern part of the county and in the Sharptown to Mardela Springs area in the northwestern part. The native vegetation is scrub hardwoods, dominantly oaks, but many of the more nearly level areas have been invaded by loblolly pine. Where the soils occupy dry, dunelike areas or sand ridges, the plant cover is mainly shortleaf and Virginia pines, and a normally heavy growth of understory shrubs is lacking. Locally, cactus grows on these dry ridges.

A typical profile has a surface layer of very dark gray loamy sand about 4 inches thick. The next layer, to a depth of about 23 inches, is much the same as the surface layer but is yellowish brown. It is underlain by a layer of pale-yellow, loose sand. Between the depths of 41 and 52 inches, the soil material is massive, olive sandy loam and sandy clay loam. Below 52 inches is massive, light-gray sandy clay loam.

The Evesboro soils are extensive in this county, and they are cultivated on about half of their total acreage. They are well suited to sweetpotatoes, watermelons, cucumbers, and other early truck crops. The soils are readily penetrated by roots, water, and air; they warm up early in spring; and they are easily worked throughout a wide range of moisture content.

On the other hand, these soils have a low organic-matter content and are strongly acid or very strongly acid unless they have been limed. Keeping the soils productive is difficult because they contain little silt, clay, and plant nutrients, and applied fertilizer and lime are leached out rapidly. The soils are droughty, their available moisture capacity is low, and shallow-rooted crops are injured in dry periods unless they are irrigated. Water enters the surface layer so rapidly that washing is only a slight hazard, but soil blowing can be severe in fields that are left exposed. Many borrow pits have been dug in these soils to obtain materials for road building and other construction.

Profile of Evesboro loamy sand, clayey substratum, 0 to 5 percent slopes, in a nearly level wooded area near the intersection of Dashiell and Rockawalking Roads, southeast of Hebron:

O1—3 to 1 inch, leaf litter, mostly loblolly pine needles.

O2—1 inch to 0, mat of decomposed organic materials.

A1—0 to 4 inches, very dark gray (10YR 3/1) loamy sand; very weak, coarse, blocky structure; very friable; a few, coarse, woody roots and fine fibrous roots; extremely acid; clear, wavy boundary. Horizon is 3 to 6 inches thick.

C1—4 to 23 inches, yellowish-brown (10YR 5/6) loamy sand; single grain, mostly in soft lumps that lack structure; very friable; a few fine roots; very strongly acid; gradual, wavy boundary. Horizon is 17 to 20 inches thick.

C2—23 to 41 inches, pale-yellow (5Y 7/3), loose sand; single grain (structureless); strongly acid; clear, wavy boundary. Horizon is 15 to 20 inches thick.

IIC3—41 to 50 inches, olive (5Y 4/3) coarse sandy loam; massive (structureless); friable when moist, slightly sticky when wet; a very few roots; extremely acid; abrupt, wavy boundary. Horizon is 8 to 10 inches thick.

IIC4—50 to 52 inches, olive (5Y 4/3) light sandy clay loam; massive; firm when moist, slightly sticky but nonplastic when wet; a very few roots; extremely acid; abrupt, wavy boundary. Horizon is 2 to 6 inches thick.

IIC5—52 to 60 inches +, light-gray (2.5Y 7/2) light sandy clay loam; massive; firm when moist, slightly sticky when wet; a very few roots; many, coarse, distinct

mottles or blotches of brownish yellow (10YR 6/8); extremely acid.

The texture above the IIC horizon is sand or loamy sand. In some areas the A and C horizons contain enough fine material that they are sticky when wet. Where the Evesboro soils are dunelike or hummocky, the IIC horizon of sandy clay loam commonly begins at a depth of more than 5 feet.

The hue ranges from 10YR to 5Y. In some undisturbed areas the profile shows a very thin A11 horizon and a somewhat thicker A12 horizon. The A horizon has a value of 3 to 6 and a chroma of 2 to 4. The lowest value generally occurs in the A11 horizon. In the C1 horizon the value is 5 or 6 and the chroma is 4 to 8. The other parts of the C horizon are similar in color but may have a higher value and generally have a lower chroma. In some places there is some graying and mottling within a few inches above the IIC horizon.

The Evesboro soils developed in the same or nearly the same kind of material as the similar Galestown soils, the somewhat poorly drained or moderately well drained Klej soils, the somewhat poorly drained or poorly drained Leon soils, the poorly drained Plummer soils, and the very poorly drained Rutlege and St. Johns soils. The Evesboro soils have a less highly colored B horizon than the Galestown soils.

Evesboro loamy sand, 5 to 15 percent slopes (EoD).—This soil lies mainly on the sand ridges of Wicomico County. In some areas it has irregular slopes and appears dunelike. Except in a few fields where watermelons and cucumbers are grown, the soil is not used for crops. It is highly susceptible to soil blowing. (Capability unit VIIs–1; woodland suitability group 5)

Evesboro loamy sand, clayey substratum, 0 to 5 percent slopes (EpB).—This soil has the profile described as typical for the series. It has a fine-textured substratum beginning at a depth of 5 to 7 feet.

Because this soil warms up quickly in spring and can be worked even when fairly wet, it is suitable for general crops and is especially desirable for early truck crops (fig. 8). Generally, it is subject to little or no erosion by water, but where the surface is dry and unprotected, especially in large fields, soil blowing is a severe hazard. (Capability unit IIIs–1; woodland suitability group 5)

Evesboro sand, 5 to 15 percent slopes (ErD).—This soil is almost pure sand; it occupies areas that are locally called sugar sandhills. The soil is one of the most droughty in the county and is not used for crops. Soil blowing is a severe hazard. (Capability unit VIIs–1; woodland suitability group 5)

Figure 8.—**A 21-day-old stand of watermelon plants on Evesboro loamy sand, clayey substratum, 0 to 5 percent slopes.**

Evesboro sand, clayey substratum, 0 to 5 percent slopes (EsB).—Locally, this soil is called sugar sand. Above the clayey substratum, which occurs at a depth of 5 to 7 feet, the soil is almost pure sand. It is not well suited to most crops and, if farmed, requires special management. It is used for cucumbers, watermelons, and similar crops. (Capability unit IVs–1; woodland suitability group 5)

Evesboro soils, 15 to 40 percent slopes (EtF).—These strongly sloping to steep soils occupy sand ridges. They have a profile that is similar to the one described as typical for the series, except that they are underlain by a clayey layer at a depth of 15 to 20 feet or more. The surface layer is sand or loamy sand. Included with these soils in mapping are small areas in which the subsoil is redder than normal.

These soils are among the drier soils in the county, and none of their acreage is cultivated. In most places the only vegetation is Virginia pine or shortleaf pine and a little undergrowth. Locally, the soils are highly suitable as sites for chickenhouses because they are never very wet and always have good air drainage. (Capability unit VIIs–1; woodland suitability group 6)

Evesboro-Galestown sands, 5 to 15 percent slopes (EvD).—The soils that make up this complex occur in such an intricate pattern that they were not mapped separately. They occupy small, scattered areas in the western part of the county. These soils normally lack a clayey, moisture-retaining layer within 6 feet of the surface. They are two of the most droughty soils in the county, and the areas in which they occur are called sugar sandhills.

These soils are little used for farming, but in some places cucumbers and watermelons have been grown under irrigation. (Capability unit VIIs–1; woodland suitability group 5)

Evesboro-Galestown sands, clayey substratum, 0 to 5 percent slopes (EwB).—Areas mapped as this complex contain more Evesboro soil than Galestown soil; they occur mainly near the Nanticoke River in the western part of the county. The soils have a moisture retaining layer that is normally within 5 to 7 feet of the surface.

Because these soils are nearly level or gently sloping, are easily worked, and require no improvement in drainage, they are used for cucumbers and watermelons and, to a lesser extent, for general farm crops. Unless they are irrigated and heavily fertilized, however, they produce a poor growth of crops. Some deep-rooted plants obtain moisture from the clayey substratum in dry periods. (Capability unit IVs–1; woodland suitability group 5)

Evesboro-Galestown-Downer loamy sands, 0 to 10 percent slopes (EyC).—The level to strongly sloping soils of this complex are so intricately intermingled that they are not separated on the soil map. Most of the unit consists of Evesboro and Galestown soils, but there are many small areas of Downer loamy sand. Although the three soils are similar in many respects, the Downer soil has a somewhat finer textured subsoil at a depth of about 20 inches. This layer is rather sticky when wet. In all the soils there is a moisture-retaining substratum, which lies at a greater depth in strongly sloping areas than in nearly level areas, but the soils are droughty and low in fertility.

Nevertheless, they warm up early in spring, are easily worked, and are used for early truck crops, though special practices are needed for conserving moisture and maintaining fertility. (Capability unit IIIs–1; woodland suitability group 5)

Fallsington Series

Soils of the Fallsington series are level to sloping, gray, and poorly drained. They formed in old marine sediments or very old alluvial deposits of sandy material containing a considerable amount of silt, clay, or both. Fallsington soils occur on flats and other areas in the uplands, mainly in the northwestern quarter of the county. They are the most extensive soils in Wicomico County, and in places they occupy areas larger than 400 acres in size. The native vegetation is forest consisting of mixed wetland hardwoods, chiefly gums and maple. Holly is common, and some pine occurs. Loblolly pine is especially abundant in cutover and second-growth stands, as well as in areas that were cleared but have reverted to trees. Cultivated fields of Fallsington soils are crossed by many ditches.

In a typical profile the surface layer is dark-gray sandy loam about 13 inches thick. The subsoil, to a depth of about 35 inches, is gray or light-gray sandy clay loam to heavy sandy loam that is mottled with yellowish brown and is sticky when wet. It is underlain by loose, light-gray sand that extends to a depth of about 46 inches. Below that depth the material is massive, light-gray sandy clay loam in the upper part and is loose, light-gray sand at a depth of about 53 inches.

These soils are farmed on more than 40 percent of their total area, and they are used as woodland and wildlife habitat in the remaining acreage. In undrained areas the water table is at or near the surface when the weather is wet. Consequently, adequate drainage must be provided if the soils are used for farming. Their available moisture capacity is high, and their natural fertility is moderate. Although the soils warm up slowly in spring, they are suited to corn, soybeans, and truck crops if they are drained, limed, and fertilized. They are easy to work and to conserve. Permeability generally is moderate to a depth of 30 inches or more, and this permits the use of either tile or open ditches for improving drainage. Because the soils have a high water table and are readily penetrated by roots, they may be more productive than well-drained soils nearby. In undrained areas the Fallsington soils are wooded, and in many old fields they are covered by some of the best stands of loblolly pine in the county.

Profile of Fallsington sandy loam, in a level wooded area on the south side of Ed Taylor Road, about 1½ miles southeast of Mardela Road, southeast of Mardela Springs:

O1—3 to 2 inches, litter of hardwood leaves, pine needles, and twigs.

O2—2 inches to 0, mat of partially decomposed organic material mixed with some mineral material; fine roots plentiful.

A1—0 to 4 inches, dark-gray (5Y 4/1) sandy loam; very weak, fine to medium, granular structure; friable when moist, slightly sticky when wet; a few woody roots and plentiful fine roots; very strongly acid; clear, wavy boundary. Horizon is 3 to 5 inches thick.

A2g—4 to 13 inches, dark-gray (5Y 4/1) sandy loam; very weak, fine to medium, granular structure; friable when moist, slightly sticky when wet; a few woody roots and plentiful fine roots; very strongly acid; clear, wavy boundary. Horizon is 3 to 5 inches thick.

B21tg—13 to 25 inches, gray or light-gray (5Y 6/1) light sandy clay loam; common, coarse, distinct mottles of yellowish brown (10YR 5/6); weak, fine to medium, subangular blocky structure; friable when moist, sticky and slightly plastic when wet; a few roots; very strongly acid; clear, smooth boundary. Horizon is 9 to 15 inches thick.

B22tg—25 to 35 inches, gray or light-gray (5Y 6/1) heavy sandy loam; many, medium, prominent mottles of yellowish brown (10YR 5/8); weak, medium, subangular blocky structure; friable when moist, slightly plastic and slightly sticky when wet; very few roots; very strongly acid; abrupt, wavy boundary. Horizon is 7 to 10 inches thick.

IIC1g—35 to 46 inches, light-gray (5Y 7/1) sand; structureless (single grain); loose; a few fine roots; contains thin lenses of light-gray (10YR 7/1) sticky silty clay; has a strong odor of hydrogen sulfide; very strongly acid; gradual, smooth boundary. Horizon is 9 to 14 inches thick.

IIIC2g—46 to 53 inches, light-gray (N 7/0) sandy clay loam; a few, fine, prominent mottles of brownish yellow (10YR 6/6); massive; firm when moist, slightly plastic and slightly sticky when wet; no roots; very strongly acid; abrupt, smooth boundary. Horizon is 6 to 9 inches thick.

IVC3g—53 to 65 inches +, light-gray (5Y 7/1) sand; structureless (single grain); loose; no roots; slightly acid.

In some places the A horizon is loam or fine sandy loam. The texture of the B2t horizon may be as fine as sandy clay loam or as coarse as sandy loam. The C horizon ranges from sand to sandy clay loam. In thickness the solum ranges from 22 to 38 inches.

In cultivated areas the Ap horizon is dark gray (5Y 4/1) or dark grayish brown (2.5Y 4/2). The hue for this profile centers on 5Y, but in some places it is N, 2.5Y, or 10YR. The latter hue occurs mostly in the A horizon. Generally, the value of the matrix increases regularly with increasing depth and the chroma is 0 to 2. In some places mottles are lacking in the C horizon. The solum is extremely acid unless the soil has been limed, but the underlying layers may be less acid than those described.

The Fallsington soils formed in the same kind of deposits as the well drained Sassafras soils, the moderately well drained Woodstown soils, and the very poorly drained Pocomoke soils. Fallsington soils are similar to the Elkton and Othello soils in drainage and morphology, but they lack the fine-textured, very slowly permeable Bt horizon of the Elkton soils, and they have a more sandy, less silty, and more permeable Bt horizon than the Othello soils.

Fallsington fine sandy loam (Fa).—Generally, this soil is level. In most respects its profile is similar to that described as typical for the series, but its surface layer is slightly finer textured and in places its subsoil is a little more clayey. Included in mapping are scattered spots in which the surface layer is sandy loam.

The improved drainage needed in this soil can be provided by tile lines; these work well if they are properly installed. Drained areas are well suited to corn, soybeans, and some kinds of truck crops. The soil is less easy to drain than Fallsington sandy loam, and it warms up more slowly in spring. Nevertheless, the two soils are farmed in about the same way. Most undrained areas of Fallsington fine sandy loam are still woodland, which commonly includes some good stands of loblolly pine. (Capability unit IIIw–6; woodland suitability group 1)

Fallsington loam (Fg).—This soil generally is level or nearly level, but in a few areas it has slopes of slightly more than 2 percent. Its surface layer contains more silt and clay and less sand than that of the soil described in the typical profile, and its subsoil is heavy sandy clay loam. In other respects the profiles of the two soils are similar.

This soil is important to farming in the county, but it needs to be drained, and it warms up rather slowly in spring. In most places drainage can be improved by tiling. After the soil is drained, it is well suited to most crops, especially corn and soybeans. (Capability unit IIIw–7; woodland suitability group 1)

Fallsington sandy loam (Fs).—In most places this extensive soil is level or nearly level, but in scattered areas it has a slope of slightly more than 2 percent. The profile is the one described as typical for the series. Included in mapping are small areas where the surface layer is more sandy than normal.

This soil is more easily drained and worked than other Fallsington soils. Open ditches are suitable for improving drainage (fig. 9), and tile lines function well if they are properly installed. If drained, the soil produces a good growth of corn, soybeans, and some kinds of truck crops. Most undrained areas remain wooded, and many of these are covered by good stands of loblolly pine. Erosion is a moderate hazard in sloping areas. (Capability unit IIIw–6; woodland suitability group 1)

Galestown Series

The Galestown series consists of deep, coarse-textured soils that are rapidly permeable and somewhat excessively drained or excessively drained. These soils formed in coarse-textured marine sediments or very old alluvium, commonly underlain by older, finer textured sediments. Although the soils are sandy throughout their profile, the clay content of the finer textured part of the subsoil is at least 3 percent higher than it is in the overlying horizon. The subsoil is highly colored, and its color contrasts sharply with that of the surface layer and the underlying material. The native vegetation is scrub hardwoods, dominantly oaks, but loblolly pine has invaded many areas, and shortleaf and Virginia pines grow on some of the dry sand ridges. Galestown soils are fairly extensive in this county.

In a typical profile the surface layer is gray or light-gray loamy sand about 5 inches thick. The upper part of the subsoil, to a depth of about 20 inches, is brown, very crumbly loamy sand. The lower part of the subsoil is strong-brown loamy sand that is slightly sticky when wet. Beginning at a depth of about 40 inches, the material is loose, light yellowish-brown loamy sand, but it gradually changes to olive-gray sand with depth.

Figure 9.—Open ditch recently installed to drain a field of Fallsington sandy loam.

In Wicomico County about three-fourths of the acreage of Galestown soils is wooded, and the rest is used for crops. These soils are easily worked and can be cultivated throughout a wide range of moisture content. They are low in natural fertility, however, and have low available moisture capacity. If the soils are cropped, special measures are needed for maintaining fertility and conserving moisture. All crops benefit from irrigation during the drier part of the growing season. In the many borrow pits that have been dug in these soils, sandy material is obtained for roadbuilding and other construction.

Profile of a Galestown loamy sand having slopes of 0 to 5 percent, in a gently sloping wooded area about six-tenths of a mile southwest of Sharptown:

O1—3 to 2 inches, litter of oak leaves and pine needles.
O2—2 inches to 0, a mat of partially decomposed organic matter mixed with some mineral material.
A1—0 to 5 inches, gray or light-gray (10YR 6/1) loamy sand; weak, fine, granular structure; very friable; roots abundant; very strongly acid; abrupt, smooth boundary. Horizon is 5 to 7 inches thick.
B1—5 to 20 inches, brown (10YR 5/3) loamy sand; structureless (single grain); very friable; roots plentiful; very strongly acid; gradual, smooth boundary. Horizon is 0 to 15 inches thick.
B2t—20 to 40 inches, strong-brown (7.5YR 5/6) loamy sand; structureless (single grain); very friable when moist; sand grains in lower part coated and, when wet, slightly sticky; few roots; bridged with clay; lower 3 inches is slightly streaked with yellowish brown (10YR 5/4) and contains many coarse sand grains; very strongly acid; abrupt, smooth boundary. Horizon is 20 to 30 inches thick.
C1—40 to 55 inches, light yellowish-brown (10YR 6/4) light loamy sand; a few streaks of brownish yellow (10YR 6/6); structureless (single grain); loose; very few roots; strongly acid; clear, wavy boundary. Horizon is 10 to 20 inches thick.
C2—55 to 70 inches; olive-gray (5Y 5/2) sand; structureless (single grain); loose; no roots; medium acid.

In small areas the A horizon is sand. Some fine, smooth pebbles can occur in any part of the profile.

In areas that have never been farmed, these soils have a very thin A1 horizon. The A horizon has a value of 2 to 6 and a chroma of 1 to 4. Here, the value generally is lowest in the A1 horizon. In the B2t horizon the value generally is 5 or 6 and the chroma is 4 to 8. The C horizon is similar to the A horizon in color, but it has a higher chroma and may have a higher value. In places the soils are underlain by an unconforming layer of sandy loam to sandy clay within 72 inches of the surface. In these places the C horizon may be mottled in the lower few inches. Except in limed areas, the A and B horizons are very strongly acid or extremely acid, but the lower part of the C horizon varies considerably in reaction, depending on the nature of the ground water.

The Galestown soils formed in the same or nearly the same kind of material as the somewhat excessively drained or excessively drained Evesboro soils, the moderately well drained or somewhat poorly drained Klej soils, the somewhat poorly drained or poorly drained Leon soils, the poorly drained Plummer soils, and the very poorly drained Rutlege and St. Johns soils. The Galestown soils have a B horizon, which is lacking in the Evesboro soils. They are similar to the Downer soils in color, but their Bt horizon is not so distinctly expressed as the one in those soils.

Galestown loamy sand, 5 to 15 percent slopes (GaD).—This soil occurs on the sand ridges of Wicomico County.

It is used for watermelons and cucumbers in some areas, but otherwise it is of little importance to farming. Rainwater enters the soil rapidly, runoff is slow, and the risk of water erosion is only slight. Soil blowing, however, is a severe hazard. (Capability unit VIIs-1; woodland suitability group 5)

Galestown loamy sand, clayey substratum, 0 to 5 percent slopes (GcB).—This soil has a profile that is similar to the one described as typical for the series, but it generally is underlain by a moisture-retaining layer at a depth of 5 to 7 feet.

This soil is well suited to early truck crops and, if carefully fertilized and managed, can be used for corn, soybean, and other truck crops. It is easily worked, warms up quickly in spring, and needs no improvement in drainage. Deep-rooted crops grow fairly well in dry periods because they can obtain moisture from the clayey substratum. Even shallow-rooted crops may benefit from the capillary rise of moisture from this clayey layer. Irrigation water should be available, however, because the capacity of the soil for holding moisture above the substratum is low. Water erosion is only a slight hazard, but soil blowing is likely if the surface is not protected when it is dry. (Capability unit IIIs-1; woodland suitability group 5)

Keyport Series

The Keyport series is made up of level to gently sloping, deep, moderately well drained soils that have a fine-textured subsoil through which water moves slowly or very slowly. These soils occur in small, scattered areas on uplands east and northeast of Salisbury. Here, they formed in beds of acid clay or silty clay that, in some places, are underlain by sandier material. The native vegetation is mixed hardwoods, including gum, red maple, and many kinds of oak. Locally, there is some loblolly pine, but this tree generally is abundant only in cutover or second-growth stands and in reforested areas.

A typical profile has a light-gray surface layer about 8 inches thick and a pale-olive subsurface layer about 4 inches thick. Both layers are silt loam that is slightly sticky when wet. The subsoil, to a depth of about 22 inches, is pale-brown silty clay that is sticky and plastic when wet. The lower part of the subsoil extends to a depth of about 43 inches. It is dominantly gray silty clay that contains yellowish and brownish mottles. This layer is firm in place but is sticky and plastic if worked or disturbed. Roots and water can penetrate the lower part of the subsoil, but their movement is slow. The underlying material is mottled, light-gray fine sandy clay loam that is slightly sticky.

The mottled subsoil indicates that these soils are poorly aerated during wet weather. They are saturated with excess water most of the winter and early in spring.

All the acreage of Keyport soils in this county is farmed now or has been farmed in the recent past. Wetness is a limitation for some deep-rooted crops, and it may hinder tillage. If the soils are drained and otherwise well managed, however, they are suited to general farm crops, though they are subject to frost heaving and warm up slowly in spring. In removing excess water, ditches are more effective than tile lines because of the slowly permeable subsoil. These soils have moderate natural fertility and are extremely acid unless they have been limed. Erosion is a hazard in sloping areas.

Profile of Keyport silt loam, 0 to 2 percent slopes, in a level area formerly cultivated but now wooded, on the east side of Rum Ridge Road, 1¼ miles south of the Delaware State line:

O1—2 to 1 inch, litter of pine needles, hardwood leaves, and twigs.

O2—1 inch to 0, mat of partially decomposed forest litter mixed with some mineral material; some fine roots.

A1—0 to 8 inches, light-gray (5Y 7/2) silt loam; weak, fine, granular structure; rather firm when moist, slightly plastic and slightly sticky when wet; a few woody roots and plentiful fine roots; this is a regenerated A1 horizon in a reforested area; an original A1 horizon is thinner and darker; very strongly acid; abrupt, smooth boundary. Horizon is 7 to 8 inches thick.

A2—8 to 12 inches, pale-olive (5Y 6/4) silt loam; weak, fine to medium, subangular blocky structure; firm when moist, slightly plastic and slightly sticky when wet; a few fine roots and very few woody roots; some light olive-gray (5Y 6/2) silty material in old root channels; extremely acid; abrupt, wavy boundary. Horizon is 5 to 8 inches thick.

B21t—12 to 22 inches, pale-brown (10YR 6/3) silty clay; moderate, very fine to coarse, subangular blocky structure; firm when moist, plastic and sticky when wet; few roots; distinct clay coatings; extremely acid; clear, wavy boundary. Horizon is 10 to 14 inches thick.

B22tg—22 to 30 inches, light olive-gray (5Y 6/2) silty clay; many, fine and medium, prominent mottles of brownish yellow (10YR 6/8); moderate, fine to coarse, blocky structure; firm when moist, plastic and sticky when wet; very few roots; distinct clay coatings; extremely acid; clear, wavy boundary. Horizon is 8 to 11 inches thick.

B23tg—30 to 43 inches, gray or light-gray (5Y 6/1) light silty clay; common, medium, distinct mottles of light yellowish brown (2.5Y 6/4) and common, fine, prominent mottles of yellowish brown (10YR 5/6); weak to moderate, fine to coarse, blocky structure; firm when moist, plastic and sticky when wet; very few roots; distinct clay coatings; very strongly acid; abrupt, smooth boundary. Horizon is 10 to 14 inches thick.

IIC—43 to 60 inches +, light-gray (2.5Y 7/2) fine sandy clay loam; common, coarse, faint mottles of olive yellow (2.5Y 6/6) and a few, medium, faint mottles of white (5Y 8/1); structureless (massive); friable when moist, slightly sticky when wet; no roots; some inclusions of olive-yellow (2.5Y 6/6) silty clay; very strongly acid.

The B2t horizon ranges from heavy silty clay loam to clay in texture, and generally it has an average clay content of more than 40 percent. In places the Keyport soils have a C horizon that may or may not be as fine textured as the B horizon, but it is structureless and lacks clay coatings. The IIC horizon ranges from sand to fine sandy clay loam. The solum is 40 to 50 inches thick.

In areas that have never been plowed, there is an A1 horizon 2 to 4 inches thick. The hue of the matrix is 10YR or yellower throughout the profile. The A horizon has a value of 3 to 7 and a chroma of 1 to 4, the lower values and chromas occurring in the A1 horizon. In the B21t horizon the value is 5 or 6, and the chroma is 3 or more. In places the B22tg horizon has a higher matrix value and a lower matrix chroma than the B21t horizon.

The Keyport soils developed in the same or nearly the same kind of material as the Elkton and Bayboro soils, but they are better drained than those soils. Keyport soils have a finer textured Bt horizon than any of the other moderately well drained soils in the county.

Keyport silt loam, 0 to 2 percent slopes (KeA).—This nearly level soil has the profile described as typical for the Keyport series. Included in mapping are a few spots where

the surface layer is a little more sandy and less silty than normal.

If this soil is worked when it is too wet or too dry, clods are formed, and these are difficult to break up when a seedbed is prepared. The soil tends to puddle and seal over and, on drying, crusts on the surface. This delays or prevents the emergence of some seedlings, and it reduces the chance of establishing a good stand of crops. Water should be carefully managed, but the hazard of erosion is only slight. (Capability unit IIw-8; woodland suitability group 11)

Keyport silt loam, 2 to 5 percent slopes (KeB).—This gently sloping soil is more susceptible to washing than Keyport silt loam, 0 to 2 percent slopes, and erosion control is of greater concern than drainage improvement. Included in areas mapped as this soil are a few small areas in which most of the original surface layer has been eroded away. These spots have a lower organic-matter content and are much more difficult to cultivate than other areas. Also included are a few small areas where the slope is slightly more than 5 percent.

This soil is suited to general farm crops if it is protected from erosion and in other respects is well managed. (Capability unit IIe-13; woodland suitability group 11)

Klej Series

In the Klej series are deep, level to gently sloping, coarse-textured soils that are somewhat poorly drained or moderately well drained. These soils lie on upland flats and in similar areas, where they formed in sandy marine sediments or very old alluvial sediments, commonly underlain by finer textured material. The native vegetation consists of mixed oaks, sweetgum, maple, holly, and some loblolly pine. In many areas that once were cultivated, loblolly pine now grows in almost pure stands.

In a typical profile the surface layer is loamy sand about 8 inches thick. It is gray or light gray in the topmost inch but is dark grayish brown below. The next layer is light yellowish-brown loamy sand that extends to a depth of about 32 inches and contains grayish spots or mottles in the lower part. It overlies a layer of light olive-gray loamy sand in which there are brownish spots. Beginning at a depth of about 42 inches is yellowish-brown sandy loam that extends to a depth of about 55 inches. Below this depth is light-gray fine sandy clay that is very firm when moist and is plastic and sticky when wet.

About two-thirds of the total acreage of Klej soils is now forested, though much of this was cultivated in years past. These soils have a seasonally high water table, but they can be drained by either tile or open ditches, though the banks of new ditches tend to cave and slip. The Klej soils are naturally acid, and lime and fertilizer are needed if crops are to be grown successfully. Maintaining productivity is difficult, however, because the supply of organic matter and plant nutrients is low and applied fertilizer leaches out rapidly. These soils can be worked throughout a wide range of moisture content and are readily penetrated by air, water, and roots, but they have low available moisture capacity and are droughty enough that crops are commonly injured in dry periods. Soil blowing is a hazard, but there is little or no risk of water erosion.

Profile of Klej loamy sand, 0 to 2 percent slopes, in a level forest of loblolly pine on the south side of old Mount Olive Road, 1 mile north of the Worcester County line:

O1—2 to 1 inch, litter of needles and twigs from loblolly pine.

O2—1 inch to 0, partially decomposed litter mixed with some mineral material.

A11—0 to 1 inch, gray or light-gray (N 6/0) loamy sand; structureless (single grain); very friable; roots plentiful; very strongly acid; abrupt, wavy boundary. Horizon is 1 to 2 inches thick.

A12—1 to 8 inches, dark grayish-brown (2.5Y 4/2) loamy sand; structureless (single grain); very friable; roots plentiful; this is a regenerated A1 horizon in a reforested area; an original A1 horizon is thinner; strongly acid; abrupt, smooth boundary. Horizon is 6 to 9 inches thick.

C1—8 to 32 inches, light yellowish-brown (2.5Y 6/4) loamy sand; a few, medium, faint mottles of light olive gray (5Y 6/2) below depth of 25 inches; structureless (single grain); very friable; very few roots; some iron concretions 5 to 20 millimeters in diameter; strongly acid; clear, smooth boundary. Horizon is 22 to 25 inches thick.

C2—32 to 42 inches, light olive-gray (5Y 6/2) loamy sand; common, coarse, faint mottles of light olive brown (2.5Y 5/4); structureless (single grain); loose; very few roots; very strongly acid; clear, wavy boundary. Horizon is 7 to 12 inches thick.

IIC3—42 to 55 inches, yellowish-brown (10YR 5/4) sandy loam; many, coarse, distinct mottles of light gray (N 7/0) and common, medium, distinct mottles of strong brown (7.5YR 5/8); structureless (massive) to very weak, fine and medium, subangular blocky structure; friable when moist, slightly plastic and slightly sticky when wet; a very few roots; very strongly acid; abrupt, smooth boundary. Horizon is 12 to 15 inches thick.

IIIC4g—55 to 66 inches, light-gray (N 7/0) fine sandy clay; common, medium, prominent mottles of brownish yellow and yellowish red (10YR 6/6 and 5YR 4/8); structureless (massive); very firm when moist, plastic and sticky when wet; 2 percent of horizon is fine smooth gravel; very strongly acid.

In small areas the A horizon is sand. Generally, the texture of the IIC horizon is sandy loam or finer.

The hue of the matrix is 10YR, 2.5Y, 5Y, or N throughout the profile. The A horizon has a value of 3 to 6 and a chroma of 0 to 6; the lower values and chromas generally occur in the A11 horizon. In the C horizon the value is 5 to 8 and the chroma is 0 to 8. The lower part of the C horizon can have a matrix of low chroma and mottling of high chroma. Dark material from the A horizon commonly extends to some depth in old root channels.

The Klej soils formed in the same or nearly the same kind of material as the somewhat excessively drained or excessively drained Galestown and Evesboro soils, the somewhat poorly drained Leon soils, the poorly drained Plummer soils, and the very poorly drained Rutlege and St. Johns soils. The Klej soils lack the Bh horizon that occurs in the Leon soils. Klej soils are similar to the Woodstown soils in drainage and color, but they are coarser textured below the A horizon than those soils and do not have a well-developed Bt horizon.

Klej loamy sand, 0 to 2 percent slopes (KsA).—The profile of this soil is the one described as typical for the series. Included in mapping are a few areas where the surface layer contains slightly more silt or clay than that described.

This soil is suited to crops commonly grown in the county, including truck crops. Except in spring, when a high water table delays planting, the soil generally does not stay wet for long periods. Providing adequate drainage through tile lines will lower the water table fairly rapidly. As the growing season advances, crops may show signs of too little moisture when the weather is hot and dry. For this reason, irrigation water should be available for vegetables and other crops of high value. Generally,

there is little or no erosion hazard. (Capability unit IIIw-10; woodland suitability group 3)

Klej loamy sand, 2 to 5 percent slopes (KsB).—This soil is slightly more susceptible to water erosion and soil blowing than the soil described as typical for the series. In addition, it is underlain by finer textured material at a greater depth than that soil, and it dries out more quickly and warms up sooner in spring. Included in mapping are a few areas having a slope of slightly more than 5 percent.

In the management of this soil, the major concerns are impeded drainage, the erosion hazard, a low level of fertility, and possible droughtiness. (Capability unit IIIw-10; woodland suitability group 3)

Leon Series

The Leon series consists of somewhat poorly drained or poorly drained, sandy soils that have a gray surface layer and a dark-brown, cemented subsoil, which is commonly called a hardpan. Locally, the subsoil material is known as Indian hearth or ironstone. These soils formed in thick beds of very acid sand or loamy sand. Most of their acreage is in the Pittsville area. The native vegetation is mainly oak, gum, and other wetland hardwoods, but there are also some pond and loblolly pines. In many cutover, or reforested areas, loblolly pine grows in almost pure stands. The undergrowth is chiefly teaberry, sedges, blueberry, and holly.

A typical profile has a surface layer of dark-gray loamy sand about 11 inches thick. Just below is a subsurface layer of light-gray loamy sand about 5 inches thick. The subsoil to a depth of 46 inches. It is a cemented pan consisting of dark-brown and very dark brown loamy sand and of dark yellowish-brown sand or loamy sand. It overlies a 15-inch layer of light yellowish-brown sand. This layer, in turn, is underlain by light-gray sandy loam that is slightly sticky when wet.

The Leon soils are naturally too wet, too strongly acid, and too low in fertility for most crops, and generally they are not farmed where they occupy large areas. They are commonly cultivated, however, where they occur in spots surrounded by better soils. If the Leon soils are drained, they hold so little moisture above the pan that plants show signs of inadequate moisture in dry periods. Most crops grow poorly, though blueberries make satisfactory growth if the level of ground water is carefully controlled. Lime and fertilizer are leached out rapidly and must be added frequently. Water erosion is only a slight hazard, but soil blowing is likely in fields that are left unprotected.

Profile of Leon loamy sand, in a forest of loblolly pine on the north side of Cop Station Road, one-fifth mile northeast of Jones Hastings Road:

O1—1 inch to 0, litter of needles and twigs from loblolly pine.

A1—0 to 11 inches, dark-gray (N 4/0) light loamy sand; structureless (single grain); very friable; roots common; many, clean, white sand grains; this is probably a regenerated horizon in an area once plowed; very strongly acid; abrupt, smooth boundary. Horizon is 9 to 11 inches thick.

A2g—11 to 16 inches, light-gray (N 7/0) light loamy sand; structureless (single grain); very friable; few roots; strongly acid; abrupt, wavy boundary. Horizon is 4 to 7 inches thick.

B2h—16 to 30 inches, dark-brown (7.5YR 3/2) and very dark brown (10YR 2/2) light loamy sand; mostly massive, but some evidence of angular blocks; very hard when dry, firm to very firm when moist; a few fine roots; strongly acid; clear, irregular boundary. Horizon is 8 to 18 inches thick.

B3h—30 to 46 inches, dark yellowish-brown (10YR 4/4) sand or very light loamy sand; structureless (single grain); friable to very friable; a very few roots; very strongly acid; clear, wavy boundary. Horizon is 10 to 18 inches thick.

C1—46 to 61 inches, light yellowish-brown (10YR 6/4) sand; structureless (single grain); loose; a very few fine roots; very strongly acid; clear, smooth boundary. Horizon is 14 to 17 inches thick.

11C2g—61 to 70 inches +, light-gray (5Y 7/1) light sandy loam; structureless (single grain); very friable when moist, slightly sticky when wet; no roots; very strongly acid.

The organic pan in the Bh horizon varies considerably in thickness and hardness. It generally appears continuous but is not uniformly cemented, and in spots it is soft enough that it can be readily penetrated by roots. The IIC horizon ranges from sandy loam to sandy clay loam in texture. This horizon normally occurs at a depth ranging from 4 to 6 feet. In cultivated areas the Ap horizon is light gray when moist and is almost white when dry. In some places the A1 horizon is thinner and the A2g horizon is thicker than those described in the typical profile. In places the B2h horizon is thinner than the typical one.

The Leon soils formed in the same or somewhat the same kind of material as the somewhat excessively drained or excessively drained Galestown and Evesboro soils, the somewhat poorly drained or moderately well drained Klej soils, the poorly drained Plummer soils, and the very poorly drained Rutlege and St. Johns soils. Soils of both the Leon and the St. Johns series have a Bh horizon cemented with organic matter, but the Leon soils are less poorly drained and their A horizon is not so dark colored as that in the St. Johns soils. The Bh horizon of the Leon soils is missing in the Klej and Plummer soils.

Leon loamy sand (Le).—This level to gently sloping soil is of little importance to farming in Wicomico County. It is better suited to trees than to cultivated crops. In places it occurs closely with the more poorly drained St. Johns soils. The Leon soil occupies long, narrow ridges that rise about 1 foot above the adjacent areas of St. Johns soils. Included in mapping are small areas in which the surface layer is mostly sand. (Capability unit Vw-5; woodland suitability group 10)

Made Land

Made land (Ma) consists of areas where the soils have been so disturbed or modified by grading or filling that they cannot be classified. This land is so variable that examination is needed on the site to determine suitability for specific uses. Most areas are used for industrial or residential developments or other nonfarm purposes. It is likely that the acreage of Made land is increasing in Wicomico County. (Capability unit not assigned; woodland suitability group 21)

Matapeake Series

The Matapeake series consists of well-drained soils of the uplands that have a grayish-brown surface layer and a distinctly brown subsoil. These soils developed in a mantle of silt and fine sand or very fine sand, possibly loess, underlain by sandy material at a depth of 3 to 4 feet. They occur mainly on the high flats next to the Wicomico River, in the area around Green Hill, and along Wicomico Creek from Trinity to Allen. The native vegetation is upland hardwoods, but practically all the acreage of Matapeake soils has been cleared and is cultivated.

A typical profile has a grayish-brown surface layer about 5 inches thick and a light yellowish-brown subsurface layer about 6 inches thick, both of silt loam that is slightly sticky when wet. The upper part of the subsoil, about 5 inches thick, is yellowish-brown, slightly sticky silt loam. It overlies the main part of the subsoil, a layer of brown to strong-brown silt loam that extends to a depth of about 34 inches. This layer is sticky and plastic when wet. The lower part of the subsoil is a thin, transitional layer and is sandier than the material just above it. The underlying material is sandy loam or loamy sand that is more sandy and paler colored with depth.

The Matapeake soils are not extensive in this county, but they are well suited to most crops and to most nonfarm uses. They retain lime and fertilizer well, they have high available water capacity, and they are readily penetrated by air, water, and roots.

Profile of Matapeake silt loam, 0 to 2 percent slopes, in a peach orchard about 1.7 miles southwest of Allen:

Ap—0 to 5 inches, grayish-brown (2.5Y 5/2) silt loam; weak, fine and medium, granular structure; friable when moist, slightly plastic and slightly sticky when wet; many roots; slightly acid (limed); abrupt, smooth boundary. Horizon is 4 to 6 inches thick.

A2—5 to 11 inches, light yellowish-brown (2.5Y 6/4) silt loam; weak, fine and medium, granular structure; friable to firm when moist, slightly plastic and slightly sticky when wet; roots common; strongly acid; clear, wavy boundary. Horizon is 4 to 8 inches thick.

B1—11 to 16 inches, yellowish-brown (10YR 5/6) silt loam; weak, medium, subangular blocky structure; friable to firm when moist, slightly sticky and slightly plastic when wet; few roots; strongly acid; clear, wavy boundary. Horizon is 3 to 6 inches thick.

B2t—16 to 34 inches, heavy silt loam, brown (7.5YR 5/4) in upper part, grading to strong brown (7.5YR 5/6) below depth of 23 inches; moderate, medium and coarse, subangular blocky structure; firm when moist, sticky and plastic when wet; very few roots; distinct, continuous clay coatings; very strongly acid; gradual, smooth boundary. Horizon is 13 to 26 inches thick.

B3—34 to 38 inches, strong-brown (7.5YR 5/6) sandy loam or light sandy clay loam; weak, medium and coarse, subangular blocky structure; friable to firm when moist, slightly plastic and slightly sticky when wet; no roots; some faint, patchy clay coatings; extremely acid; clear, smooth boundary. Horizon is 3 to 7 inches thick.

IIC1—38 to 58 inches, light yellowish-brown (2.5Y 6/4) light sandy loam or heavy loamy sand; a few, medium, prominent streaks of light gray (5Y 7/2); structureless (massive) to very weak, medium, subangular blocky structure; very friable when moist, slightly sticky when wet; no roots; very strongly acid; clear, smooth boundary. Horizon is 12 to 22 inches thick.

IIIC2—58 to 62 inches, pale-yellow (5Y 7/3) and yellowish-brown (10YR 5/8) loamy sand; structureless (single grain); very friable to loose; very strongly acid.

In some places the A horizon is fine sandy loam. The B horizon ranges from silt loam to silty clay loam in texture and may include a little noticeable sand. The solum is 27 to 40 inches thick. The IIC horizon ranges from sand to sandy loam, and locally it is somewhat gravelly. In wooded areas the A1 horizon is very dark grayish brown. In places the B horizon is dark yellowish brown. Where the soils are used for row crops, the Ap horizon is much thicker than the one described and commonly includes all or nearly all of the A2 horizon.

The Matapeake soils developed in the same or nearly the same kind of material as the moderately well drained Mattapex soils, the poorly drained Othello soils, and the very poorly drained Portsmouth soils. The Matapeake soils are similar to the Sassafras soils in drainage and morphology, but their solum contains much more silt than that of the Sassafras soils.

Matapeake fine sandy loam, 0 to 2 percent slopes (MdA).—In this soil the surface layer contains less silt and more fine sand than that of the profile described as typical for the series. The plow layer ordinarily is very crumbly and can be worked throughout a wider range of moisture content than the one in that soil.

This soil is one of the best for farming in the county. It is nearly level and subject to little or no erosion. Under the good management common in the area, the soil has no important limitations and can be used continuously for almost any kind of crop grown locally. (Capability unit I–5; woodland suitability group 7)

Matapeake fine sandy loam, 2 to 5 percent slopes, moderately eroded (MdB2).—The profile of this soil is similar to that described as typical for the series, except that its surface layer is fine sandy loam and has been thinned by erosion. In many areas plowing to normal depth turns up part of the brown, finer textured subsoil.

This soil is suitable for practically any use. If it is well protected from erosion, it can be cultivated regularly. (Capability unit IIe–5; woodland suitability group 7)

Matapeake silt loam, 0 to 2 percent slopes (MeA).—This nearly level soil has the profile described as typical for the series. In some places material from the subsoil, rolled between thumb and forefinger, feels slightly gritty. Included in mapping are a few areas where the surface layer is less silty than normal.

This soil is one of the best for farming in the county, and it has practically no limitations that affect its use for almost any crop or other purpose. The available moisture capacity is high. In a few areas there has been some compaction by heavy machinery that was used when the soil was too wet. (Capability unit I–4; woodland suitability group 7)

Matapeake silt loam, 2 to 5 percent slopes, moderately eroded (MeB2).—This soil has lost enough of its original surface layer through erosion that subsoil material is mixed into the plow layer if the soil is cultivated to normal depth. Erosion control measures are needed in fields where tilled crops are grown. (Capability unit IIe–4; woodland suitability group 7)

Matapeake silt loam, 5 to 10 percent slopes (MeC).—This soil has been protected and is not appreciably eroded, though it is highly susceptible to erosion. Included in mapping are small areas in which all of the original surface layer has been washed away and, where the soil is steepest, a few gullies have been formed. Also included are a few small areas in which slopes are greater than 10 percent.

If this soil receives good care, it can be safely used for regular cultivation. (Capability unit IIIe–4; woodland suitability group 8)

Matawan Series

The Matawan series consists of deep, level to steep soils that are moderately well drained or well drained. These soils formed in marine sediments or very old alluvial sediments that were sandy in the upper part and finer textured in the lower part. They occur mainly in the central part of the county, where they commonly occupy individual areas of 500 acres or more. The native vegetation is chiefly oak, gum, beech, and loblolly pine. Some fields that were formerly cultivated are now covered by almost pure stands of loblolly pine. The Matawan soils are extensive in Wicomico County.

In a typical profile the surface layer is dark grayish-brown sandy loam about 6 inches thick. Just below is a subsurface layer of light yellowish-brown to light olive-brown sandy loam about 15 inches thick. The upper part of the subsoil extends to a depth of about 28 inches and is yellowish-brown sandy clay loam that is sticky when wet. The lower part of the subsoil, to a depth of about 38 inches, is pale-olive, mottled clay loam. This layer, when wet, is plastic and very sticky. Between the depths of 38 and 60 inches, the soil material is light-gray, stratified sandy clay and sandy loam that are prominently mottled.

Of the total acreage of Matawan soils in this county, about two-thirds is in cultivation. Corn, soybeans, and sweetpotatoes are the principal crops. The combined thickness of the surface and subsurface layers helps in determining if an area can be successfully farmed or should be left wooded. Generally, areas in which these layers are thickest are preferred for cultivation, probably because they need the least improvement in drainage. Although the Matawan soils are somewhat wet in winter, they usually warm up fairly early in spring. Their thick surface and subsurface layers are readily permeable to water, air, and roots.

The available moisture capacity of these soils is only moderate, but the subsoil contains enough clay that it retains moisture in dry periods and supports a perched water table in wet periods. Although natural fertility is not high, crops respond well to good management and, in many years, would benefit from irrigation. In addition to nearly all farm crops, the soils are well suited to trees.

Profile of Matawan sandy loam, 0 to 2 percent slopes, in a level area covered with loblolly pine, about 300 feet west of Rockawalking Road, 1 mile south of U.S. Highway 50:

O1—2 to 1 inch, litter of needles and a few hardwood leaves.

O2—1 inch to 0, a mat of decomposed organic materials.

A1—0 to 6 inches, dark grayish-brown (10YR 4/2) sandy loam; weak, medium, granular structure; very friable; roots common; very strongly acid; gradual, wavy boundary. Horizon is 6 to 8 inches thick.

A2—6 to 17 inches, light yellowish-brown (2.5Y 6/4) light sandy loam; weak, fine, granular structure; very friable; roots fairly common; very strongly acid; gradual, wavy boundary. Horizon is 9 to 14 inches thick.

A3—17 to 21 inches, light olive-brown (2.5Y 5/6) light sandy loam; weak, medium and coarse, subangular blocky structure and weak, fine, granular structure; friable; roots fairly common; extremely acid; clear, wavy boundary. Horizon is 0 to 4 inches thick.

B21t—21 to 28 inches, yellowish-brown (10YR 5/6) sandy clay loam, faintly variegated with strong brown (7.5YR 5/6); weak, medium and coarse, blocky and subangular blocky structure; friable when moist, sticky and slightly plastic when wet; a few woody roots; very strongly to extremely acid; abrupt, wavy boundary. Horizon is 0 to 10 inches thick.

IIB22t—28 to 38 inches, pale-olive (5Y 6/4) clay loam; a few, medium, prominent mottles of strong brown (7.5YR 5/6); weak, medium, blocky and subangular blocky structure; firm when moist, plastic and very sticky when wet; a very few woody roots; some thin, yellowish-brown (10YR 5/6) clay coatings; about 1 percent of horizon is very fine smooth gravel; extremely acid; gradual, wavy boundary. Horizon is 8 to 24 inches thick.

IIICg—38 to 60 inches, light-gray (2.5Y 7/2), stratified sandy clay and sandy loam; common, coarse, prominent mottles of reddish yellow (7.5YR 6/8); structureless (massive); friable when moist, sticky when wet; a very few roots; extremely acid.

The A horizon is sandy loam, fine sandy loam, or loamy sand. Locally, the B21t horizon is lacking. The B and IIB horizons range from light sandy clay loam to clay loam. In some places the C horizon is sandy clay loam or silty clay. In fields that have been plowed, the Ap horizon is generally dark grayish brown but ranges from grayish brown to brown. The A horizon is thicker where it is loamy sand than where it is sandy loam or fine sandy loam. In places the loamy sand A horizon is as much as 30 inches thick. The solum has a thickness ranging from 36 to 50 inches.

The Matawan soils are a little better drained than most of the moderately well drained soils in the county, but they are not quite so well drained as the Norfolk soils and other well drained soils with which they are associated. Matawan soils have a finer textured Bt horizon than the Norfolk soils, and this horizon, unlike the one in Norfolk soils, is mottled at some depth between 20 and 36 inches. The Matawan soils are better drained than the Keyport, Woodstown, and Klej soils. They lack the clay or silty clay Bt horizon of the Keyport soils, but they do have a Bt horizon, which is missing in the Klej soils. The solum of Matawan soils contains much less silt than that of the Mattapex soils.

Matawan fine sandy loam, 0 to 2 percent slopes (MfA).—This nearly level soil has a profile somewhat similar to the one described as typical for the series, but it contains finer sand grains and in places has a slightly finer textured, more sticky subsoil. Consequently, this soil warms up a little more slowly in spring and has a higher capacity for holding moisture available to plants than the more sandy Matawan soils. In fields used for crops, lime and a liberal amount of fertilizer are needed. Plant nutrients are retained fairly well. Water erosion is only a slight hazard, but soil blowing is likely in areas that are left unprotected. (Capability unit IIw-10; woodland suitability group 3)

Matawan fine sandy loam, 2 to 5 percent slopes (MfB).—On this soil runoff is medium, and in places a part of the original surface layer has been washed away. If the soil is protected from erosion and otherwise is adequately managed, it is well suited to most crops commonly grown. Windbreaks are useful in the control of soil blowing. (Capability unit IIe-36; woodland suitability group 3)

Matawan loamy sand, 0 to 2 percent slopes (MmA).—Except for its sandier and generally thicker surface layer, this soil has a profile that is similar to the one described for the series.

This soil, as well as other loamy sands of the series, is more droughty in dry periods and is less suitable for crops than finer textured Matawan soils. Use is limited by somewhat impeded drainage, by droughtiness, and by the risk of soil blowing. Large, wide areas not protected by windbreaks are highly susceptible to soil blowing if the surface is left exposed. Irrigation water may be needed when the weather is dry. (Capability unit IIw-10; woodland suitability group 3)

Matawan loamy sand, 2 to 5 percent slopes (MmB).—The surface layer of this soil commonly is thinner than that of Matawan loamy sand, 0 to 2 percent slopes.

Improved drainage is needed for only some uses, and draining the soil is of lesser concern than protecting it from erosion. Soil losses can be checked by using rather simple measures. Truck crops and other shallow-rooted crops grow better in dry periods if they are irrigated. (Capability unit IIe-36; woodland suitability group 3)

Matawan loamy sand, 5 to 10 percent slopes (MmC).—This sloping soil is somewhat more droughty than more

mildly sloping Matawan loamy sands because the finer textured, moisture-retaining part of the subsoil occurs at a greater depth. In addition, this soil is more susceptible to erosion. Included in mapping are some moderately eroded areas and a few severely eroded spots that are marked by shallow gullies. Also included are a few small spots in which the surface layer is somewhat finer textured than loamy sand.

This soil can be used for all crops and is well suited to cucumbers, watermelons, and sweetpotatoes. It can be cultivated regularly if it is protected from erosion. Crops benefit from irrigation in dry periods. (Capability unit IIIe-36; woodland suitability group 3)

Matawan loamy sand, 10 to 30 percent slopes (MmE).—This soil is too steep for cultivation and should be permanently covered by pasture, trees, or other vegetation. Included in mapping are areas that are moderately or severely eroded and spots where the surface layer is silt loam. (Capability unit VIIe-2; woodland suitability group 9)

Matawan sandy loam, 0 to 2 percent slopes (MnA).—This soil is fairly extensive in Wicomico County. It has the profile described as typical for the series.

Except that improved drainage is needed for most crops, this soil has few limitations that affect its use. Under good management, it is well suited to corn, soybeans, and many kinds of truck crops. The plow layer is easy to work. Soil blowing is a hazard in large fields that are left unprotected, but there is little or no risk of water erosion. (Capability unit IIw-10; woodland suitability group 3)

Matawan sandy loam, 2 to 5 percent slopes (MnB).—This soil is more erodible than Matawan sandy loam, 0 to 2 percent slopes. In some places it has lost part of its original surface layer, and a few included areas are severely eroded. Controlling water erosion and soil blowing is the main concern of management. (Capability unit IIe-36; woodland suitability group 3)

Mattapex Series

The Mattapex series consists of loamy, level to gently sloping, moderately well drained soils that developed in a thin mantle of silty and fine sandy material over a sandy substratum. These soils lie in small areas scattered on upland flats, mostly between Whitehaven and Green Hill and from Trinity to Allen. Generally, they occur with the Matapeake and Othello soils. The native vegetation is mixed hardwoods and loblolly pine. In some second-growth areas, loblolly pine grows in almost pure stands. The Mattapex soils are not extensive in this county, but they are important to farming.

A typical profile has a plow layer of dark grayish-brown silt loam about 7 inches thick. Next is a subsurface layer of light olive-brown silt loam about 4 inches thick. The upper part of the subsoil, which extends to a depth of about 32 inches, is light yellowish-brown to brownish-yellow silty clay loam. This layer is sticky when wet and contains many gray or light-gray mottles below a depth of about 23 inches. The lower part of the subsoil, to a depth of about 39 inches, is brownish-yellow, sticky loam in which there are distinct mottles of grayish brown. It is underlain by mottled, light olive-brown sandy loam and light-gray loamy sand.

The Mattapex soils are well suited to corn, soybeans, and some other crops. Most of their acreage is farmed. The soils are strongly acid or very strongly acid unless they have been limed. They retain lime and fertilizer well.

Profile of Mattapex silt loam, 0 to 2 percent slopes, in a level orchard about 1.4 miles southwest of Allen:

Ap—0 to 7 inches, dark grayish-brown (10YR 4/2) silt loam; weak, fine to medium, granular structure; friable when moist, slightly plastic and slightly sticky when wet; roots abundant; medium acid (probably limed); abrupt, smooth boundary. Horizon 6 to 8 inches thick.

A2—7 to 11 inches, light olive-brown (2.5Y 5/4) silt loam; weak to very weak, medium and coarse, subangular blocky structure; friable when moist, slightly plastic and slightly sticky when wet; roots plentiful; some dark coatings, probably of silt, on aggregates and in old root channels; medium acid; clear, wavy boundary. Horizon is 3 to 5 inches thick.

B21t—11 to 23 inches, light yellowish-brown (10YR 6/4) silty clay loam, faintly variegated with yellowish brown (10YR 5/6); weak to moderate, fine to coarse, blocky and subangular blocky structure; firm when moist, plastic and sticky when wet; roots plentiful in upper part; some thin, discontinuous clay coatings; strongly acid; clear, smooth boundary. Horizon is 8 to 14 inches thick.

B22t—23 to 32 inches, brownish-yellow (10YR 6/6) silty clay loam; many, medium, distinct mottles of gray or light gray (10YR 6/1); weak, coarse, subangular blocky and moderate, fine, blocky structure; firm when moist, plastic and sticky when wet; very few roots; faint clay coatings; strongly acid; abrupt, wavy boundary. Horizon is 7 to 11 inches thick.

IIB23t—32 to 39 inches, brownish-yellow (10YR 6/6) loam; common, medium, distinct mottles of gray or light gray (10YR 6/1) and common, coarse, distinct mottles of grayish brown (2.5Y 5/2); weak, fine to medium, blocky structure; firm when moist, sticky and slightly plastic when wet; very few roots; some faint, discontinuous clay coatings on vertical aggregate faces; very strongly acid; clear, smooth boundary. Horizon is 0 to 10 inches thick.

IIC1—39 to 46 inches, light olive-brown (2.5Y 5/4) sandy loam; common, medium, distinct mottles of yellowish brown (10YR 5/6) and common, medium, faint mottles of grayish brown (2.5Y 5/2); structureless (massive) to very weak, fine, subangular blocky structure; very friable when moist, slightly plastic and slightly sticky when wet; no roots; very strongly acid; gradual, wavy boundary. Horizon is 6 to 10 inches thick.

IIC2g—46 to 66 inches, light-gray (5Y 7/1) loamy sand, light yellowish brown (2.5Y 6/4) in some places; structureless (single grain); very friable; no roots; very strongly acid.

The A horizon is loam or silt loam. The B horizon ranges from heavy silt loam to silty clay loam and may include some noticeable sand grains. The IIC horizon ranges from sand to sandy loam and locally is somewhat gravelly. In undisturbed areas there is a 2-inch, very dark gray (10YR 3/1) A1 horizon, which is destroyed by plowing. Mottling may appear at any depth below 15 inches. The solum ranges from 24 to 40 inches in thickness.

The Mattapex soils developed in the same or somewhat the same kind of material as the well-drained Matapeake soils, the poorly drained Othello soils, and the very poorly drained Portsmouth soils. Mattapex soils are similar to the Woodstown and Keyport soils in drainage and morphology, but they are more silty throughout than the Woodstown soils, and they have a coarser textured, less slowly permeable Bt horizon than the Keyport soils.

Mattapex loam, 0 to 2 percent slopes (MpA).—This soil has a profile similar to that described as typical for the series, but its plow layer is less silty, contains more fine

sand, and can be worked throughout a wider range of moisture content. Although this soil is nearly level and generally is not affected by erosion, it has impeded drainage that causes the surface layer to be wet and cold in spring and commonly delays the planting of crops. Excess water can be removed through ditches or tile lines. If the soil is adequately drained, it is well suited to most crops commonly grown in the county. Included in areas mapped as this soil are a few small areas where the surface layer is somewhat more sandy than normal. (Capability unit IIw-1; woodland suitability group 11)

Mattapex loam, 2 to 5 percent slopes (MpB).—Erosion is a hazard on this soil because the intake of rainwater is fairly slow and runoff is excessive at times. Controlling erosion is commonly of greater concern than improving drainage. If the surface is protected and if excess water is carefully removed, the soil can be cultivated regularly. It is suited to most crops grown locally. Included in mapping are a few areas where the surface layer is somewhat more sandy than normal. (Capability unit IIe-16; woodland suitability group 11)

Mattapex silt loam, 0 to 2 percent slopes (MtA).—This soil, the most extensive Mattapex soil in the county, has the profile described as typical for the series. The main concern of management is removing and carefully disposing of excess water in spring. If the soil is limed and fertilized, it generally produces a good growth of most crops, though it is less easily drained and worked than Mattapex loam, 0 to 2 percent slopes. (Capability unit IIw-1; woodland suitability group 11)

Mattapex silt loam, 2 to 5 percent slopes (MtB).—On this soil, erosion is the most important management concern, but it can be controlled with suitable conservation practices. If the soil is properly managed, it is well suited to most crops commonly grown in the county. Included in areas mapped are a few areas that are moderately eroded and a few spots in which the slope is slightly more than 5 percent. (Capability unit IIe-16; woodland suitability group 11)

Mixed Alluvial Land

Mixed alluvial land (Mv) occupies the nearly level bottom land, or flood plain, along many streams and rivers of this county. In some places it is flooded several times a year, but in others, perhaps only once in several years. The material lacks uniform or distinct characteristics. Within short distances the surface layer ranges from sand to loam or silt loam in texture and mainly from light gray to dark gray in color. In places where much organic matter has accumulated, however, the surface layer is black. Drainage generally is very poor, but there are some spots that are better drained.

The native vegetation varies with the texture of the soil material and the degree of wetness. Red maple, oaks, and gums are the most common trees. Pawpaw and baldcypress grow in the wetter areas, and loblolly pine occurs in places that are not so wet.

Because this land type is variable and generally wet, not much of it is used for farming. Most areas are wooded, but if the land were drained, it could be used for pasture or forage crops. (Capability unit VIw-1; woodland suitability group 2)

Muck

Muck (Mu) consists of very poorly drained to ponded, extremely acid organic soils that lie mainly in large areas on flats between the Pocomoke River and the adjacent uplands. These soils, which have not been classified by soil series, developed in the well-decomposed remains of plant materials, mostly hardwood leaves, partially mixed with acid mineral sediments, generally sand. They are underlain by sandy material. The native vegetation once included much Atlantic white-cedar and baldcypress, but now it is mostly red maple, bay bushes, and sweetgum. In addition, a few baldcypress trees remain in the stand.

An area typical of Muck is located in a heavily wooded part of Pocomoke Swamp, southeast of Purnells Crossing. Here, a 3-inch mat of leaves, twigs, and roots overlies a layer of very dark brown, crumbly muck about 14 inches thick. The next layer is black, crumbly muck that extends to a depth of about 25 inches. Just below is black, firm but sticky muck that is mixed with some silt and clay and contains a few thin layers of sand. It extends to a depth of about 49 inches. Underlying this material is very pale brown, loose sand extending to a depth of several feet.

Where the layers of muck are thinner than those described, these organic soils grade toward the Bayboro, Pocomoke, Portsmouth, or Rutlege soils. In places the surface layer of Muck is black or dark brown. In some areas this layer has been covered with sand deposited by floodwater. The depth of the organic material varies from place to place. It generally ranges from 3 to 6 feet, but the depth measured in one area is 19 feet.

Muck soils are very wet and extremely acid, and they shrink and subside as they dry. They burn readily if they are completely dry. The soils are not farmed in this county, but they provide food and shelter for wildlife, as well as a small supply of timber. In many places they are suitable for excavated ponds. If drainage were improved and the water level carefully controlled, Muck could be used for some kinds of specialty crops, including blueberries and some truck crops. (Capability unit IVw-7; woodland suitability group 21)

Norfolk Series

In the Norfolk series are deep, well-drained, dominantly sandy soils on uplands. These nearly level to steep soils developed in thick beds of sandy material containing a rather small amount of clay and very little silt. They occur mainly near Salisbury in the central part of the county. The soils are rather extensive; some tracts are more than 500 acres in size. The native vegetation consists mainly of oaks, many of them scrubby, and other hardwoods. In addition, loblolly pine occurs in nearly level areas, and shortleaf and Virginia pines grow on ridges. Large fields of Norfolk soils appear as dark grayish-brown to grayish-brown sandy areas unbroken by drainage ditches.

A typical profile has a dark grayish-brown loamy sand surface layer about 9 inches thick. This layer overlies light brownish-gray loamy sand about 9 inches thick. The subsoil is yellowish brown throughout. The upper part of it, to a depth of 28 inches, is sandy loam. Just below is the main part of the subsoil, a layer of sandy clay loam that is slightly sticky when wet. This layer extends to a depth of about 43 inches. The lower part of the subsoil, to a

depth of about 49 inches, is slightly sticky sandy loam. It is underlain by yellow, very crumbly loamy sand.

These soils are farmed on almost all of their acreage. Sweetpotatoes are the principal crop, but corn and soybeans also are commonly grown, and so are melons, cucumbers, and strawberries. Norfolk soils warm up early in spring; they can be worked throughout a wide range of moisture content; and they are readily penetrated by roots, air, and water. Their available moisture capacity is only moderate, however, and their natural fertility is fairly low. Lime and a liberal amount of fertilizer are needed for a good growth of crops. In addition, crops benefit from irrigation during the drier part of the cropping season. These soils are susceptible to soil blowing, especially in large open fields that are not protected by windbreaks. During the months of February through April, the wind frequently damages fields from which strawberry plants have been removed.

Profile of Norfolk loamy sand, 0 to 2 percent slopes, in an orchard 1,000 feet east of U.S. Highway 13, one-half mile north of Brewington Branch, north of Salisbury:

Ap—0 to 9 inches, dark grayish-brown (2.5Y 4/2) loamy sand; very weak, medium to coarse, granular structure; very friable; roots abundant; very strongly acid; clear, wavy boundary. Horizon is 8 to 10 inches thick.

A2—9 to 18 inches, light brownish-gray (2.5Y 6/2) loamy sand; very weak, medium, granular structure; very friable; roots plentiful; very strongly acid; gradual, wavy boundary. Horizon is 7 to 11 inches thick.

B1—18 to 28 inches, yellowish-brown (10YR 5/6) sandy loam; very weak, medium and coarse, subangular blocky structure; friable when moist, slightly sticky when wet; roots plentiful; very strongly acid; gradual, smooth boundary. Horizon is 5 to 10 inches thick.

B2t—28 to 43 inches, yellowish-brown (10YR 5/6) light sandy clay loam; very weak, medium and coarse, subangular blocky structure; friable to firm when moist, slightly plastic and slightly sticky when wet; a few fine roots; thin, indistinct clay coatings, but much clay bridging between sand grains; about 5 percent of horizon is fine smooth gravel; very strongly acid; gradual, wavy boundary. Horizon is 10 to 20 inches thick.

B3—43 to 49 inches, yellowish-brown (10YR 5/6) sandy loam; very weak, medium subangular blocky structure; friable when moist, slightly sticky when wet; a few fine roots; about 5 percent of horizon is fine smooth gravel; very strongly acid; abrupt, wavy boundary. Horizon is 5 to 8 inches thick.

C—49 to 54 inches +, yellow (10YR 7/6) loamy sand; structureless (single grain); very friable; no roots; some fine, smooth gravel; very strongly acid.

The A horizon is light loamy sand to heavy loamy sand. In places the Ap horizon is grayish brown. Where the soils are wooded, they have a dark-gray (10YR 4/1) A1 horizon. In the B horizon the texture ranges from sandy loam to sandy clay loam. In places the B2t horizon is thicker than the typical one or extends to a depth of more than 50 inches. Generally, the solum is more than 40 inches thick. In some places the C horizon is faintly mottled with gray. In many areas the fine gravel described in the typical profile is lacking.

The Norfolk soils are similar to the Downer soils in many respects, but they are dominantly yellowish brown instead of brown. Norfolk soils are less reddish than the Sassafras soils, and their solum contains less clay and considerably less silt than that of the Sassafras soils. The Norfolk soils are better drained than the Matawan soils, and they have a coarser textured, more permeable subsoil.

Norfolk loamy sand, 0 to 2 percent slopes (NoA).—This soil has the profile described as typical for the series. The soil is adequately drained and is subject to little or no erosion, but its use is limited by moderately low fertility and low available moisture capacity. Even so, the soil is well suited to most crops (fig. 10) and can be safely cultivated year after year if a winter cover crop is grown after each clean-tilled crop. Cover crops help to maintain fertility and to keep the soil from blowing during windy periods. (Capability unit IIs-4; woodland suitability group 7)

Norfolk loamy sand, 2 to 5 percent slopes (NoB).—This soil has lost some of its original surface layer through washing, but in most other respects its profile is similar to that described as typical for the series. In managing this soil, sandiness is of greater concern than the erosion hazard. Irrigation water is needed in dry periods. Losses of soil can be checked by using fairly simple practices. (Capability unit IIs-4; woodland suitability group 7)

Norfolk loamy sand, 5 to 10 percent slopes (NoC).—This soil is more erodible, more droughty, and less suitable for cropping than Norfolk loamy sand, 0 to 2 percent slopes. In many places it has lost some of its original surface layer through erosion, and in a few areas it has lost a good part of it.

This soil can be cultivated regularly if it is kept fertile and is protected from blowing and washing. Cucumbers, watermelons, and sweetpotatoes are among the well-suited crops. Irrigation water is needed in dry periods. (Capability unit IIIe-33; woodland suitability group 8)

Norfolk and Sassafras soils, 10 to 15 percent slopes (NsD).—This mapping unit consists of Norfolk soils and Sassafras soils that were mapped together because they occupy only a small total acreage and are managed in about the same way. These soils have a surface layer of loamy sand or sandy loam. They occur on the sides of small ravines and along river bluffs. They are strongly sloping and, in some areas, have lost a significant amount of their original surface layer through erosion. Most of the acreage not damaged by erosion is covered with trees or other vegetation.

The use of these soils is strongly limited by slope. Cultivated crops are poorly suited, and if they are grown, soil washing is likely to be severe. Sod crops or other close-growing plants make a good protective cover. (Capability unit IVe-5; woodland suitability group 8)

Figure 10.—Cultivating sweetpotatoes on Norfolk loamy sand, 0 to 2 percent slopes.

Norfolk and Sassafras soils, 15 to 30 percent slopes (NsE).—The soils that make up this unit lie mainly along river bluffs and are among the steepest in the county. Because some of the soil material has been removed by geologic erosion, these soils are shallower than those described for their respective series. The surface layer is loamy sand or sandy loam. Most of the acreage is protected by trees or sod, and little of it has ever been farmed. Consequently, accelerated erosion has occurred in only a few scattered spots. Included in areas mapped as these soils are a few small areas in which the slope is slightly greater than 30 percent.

The soils in this unit are well suited to trees. If they are cleared, they can be safely used for forage crops or pasture. (Capability unit VIe–2; woodland suitability group 9)

Othello Series

The Othello series is made up of poorly drained, gray, loamy soils. These level to very gently sloping soils occupy wide flats and similar areas on uplands. They formed in a thin mantle of silt and fine sand or very fine sand underlain by coarser textured material at a depth of about 3 feet. In Wicomico County the Othello soils are extensive; the largest areas lie between Quantico and Nanticoke. The native vegetation consists of water-tolerant hardwoods, together with pond pine and loblolly pine. In heavily cutover and reforested areas, loblolly pine occurs in pure stands. Where the soils are farmed, they are crossed by many ditches and appear white or nearly white when dry.

In a typical profile the surface layer is gray or light-gray silt loam about 2 inches thick, and the subsurface layer is light-gray, faintly mottled silt loam about 9 inches thick. The subsoil, between the depths of 11 and 35 inches, is gray or light-gray silty clay loam that is mottled with yellowish brown and is sticky and plastic when wet. It is underlain by gray and light brownish-gray loamy sand that, in many places, is distinctly stratified.

About one-fourth of the total area of Othello soils is presently cropped, but almost all of their acreage was formerly cultivated. Many fields once used for crops have reverted to trees, including some good stands of loblolly pine. Such fields were originally drained with ditches dug by slaves.

Unless the Othello soils are artificially drained, they may be covered by water late in winter and early in spring. Open ditches are most commonly used for improving drainage. Tile is not very effective, because water moves moderately slowly through the subsoil. The Othello soils are very strongly acid unless they have been limed, but they have high capacity for holding nutrients and moisture available to plants. Where drainage is improved, the surface layer is easily penetrated by roots, air, and water. Drained areas are well suited to corn and soybeans. Undrained areas produce good stands of timber.

Profile of Othello silt loam, in a level wooded area on the north side of Nanticoke Road, about 0.7 mile east of Royal Oak:

O1—2 to 1 inch, litter of needles and hardwood leaves, some partially decomposed.

O2—1 inch to 0, mat of mostly decomposed forest litter, mixed with some mineral material; fine roots plentiful.

A1—0 to 2 inches, gray or light-gray (5Y 6/1) silt loam; very weak, fine to medium, granular structure; friable to firm when moist, slightly plastic and slightly sticky when wet; roots abundant; very strongly acid; abrupt, wavy boundary. Horizon is 2 to 3 inches thick.

A2g—2 to 11 inches, light-gray (5Y 7/1) silt loam; a few, coarse, faint mottles of pale yellow (5Y 7/3); very weak, fine to very fine, subangular blocky structure; friable to firm when moist, slightly plastic and slightly sticky when wet; roots plentiful; very strongly acid; abrupt, irregular boundary. Horizon is 6 to 13 inches thick.

B21tg—11 to 28 inches, gray or light-gray (5Y 6/1) light silty clay loam; many, medium, distinct mottles of light yellowish brown (10YR 6/4) and common, fine, prominent mottles of yellowish brown (10YR 5/8); weak, fine to medium, subangular blocky structure; firm when moist, plastic and sticky when wet; roots common; very strongly acid; clear, wavy boundary. Horizon is 12 to 19 inches thick.

B22tg—28 to 35 inches, gray or light-gray (N 6/0) silty clay loam; common, medium to coarse, prominent mottles of yellowish brown (10YR 5/6); weak, fine to medium, subangular blocky structure; firm when moist, plastic and sticky when wet; a few fine roots; strongly acid; clear, wavy boundary. Horizon is 4 to 9 inches thick.

IIC1g—35 to 55 inches, gray (10YR 5/1) loamy sand, together with thin horizontal lenses of sandy clay and with pockets of light gray (5Y 7/1) loamy sand; structureless (loamy sand single grain, sandy clay massive); friable when moist, slightly sticky when wet; very few roots; about 2 percent of horizon is fine smooth gravel; strongly acid; clear, wavy boundary. Horizon is 18 to 25 inches thick.

IIC2—55 to 68 inches +, light brownish-gray (10YR 6/2) loamy sand; common, medium, faint mottles of gray or light gray (10YR 6/1) and common, medium, distinct mottles of yellowish brown (10YR 5/6); structureless (single grain); very friable when moist, slightly sticky when wet; no roots; about 10 percent of horizon is fine smooth gravel; medium acid.

The B2t horizon ranges from silt loam to silty clay loam in texture, and locally it is very heavy sandy clay loam in part. In places there is a thin, transitional B3g horizon of clay loam or sandy clay loam. The IIC horizon is of any sandy texture ranging from sand to sandy clay. In some places this horizon is uniform in texture, but in others it is stratified. Gravel occurs in the profile in only a few places. Where the soils have been cultivated, the Ap horizon generally is grayish brown or dark grayish brown. In some wooded areas the A horizon is darker gray than the one described. The solum normally ranges from 24 to 36 inches in thickness.

The Othello soils developed in the same or nearly the same kind of material as the well drained Matapeake soils, the moderately well drained Mattapex soils, and the very poorly drained Portsmouth soils. The Othello soils are similar to the Fallsington and Elkton soils in drainage and morphology. They have a less sandy, more silty, less readily permeable B2 horizon than the Fallsington soils, and their B2 horizon is not so fine textured and is more permeable than that of the Elkton soils.

Othello silt loam (0 to 2 percent slopes) (Ot).—This soil has the profile described as typical for the series. It is one of the most extensive soils in the county. Most of it is practically level, and erosion normally is not a hazard, but there are a few gently sloping areas that are slightly susceptible to washing. Poor drainage is the chief limitation. The soil retains applied nutrients and responds well to good management, but it warms up slowly, and planting of crops is usually delayed in spring. (Capability unit IIIw–7; woodland suitability group 10)

Othello silt loam, low (Ow).—This level or nearly level soil has a profile that is similar to the one described as typical for the series, but it lies so close to sea level that occasionally it is flooded when the tide is exceptionally

high. The soil remains wet for long periods and is almost impossible to drain because suitable outlets generally are lacking. Some areas have been seriously affected by salt water and in some ways resemble Tidal marsh.

Generally, this soil is not suited to cultivated crops. Its suitability for cropping could be improved by diking to exclude salt water and by using drainage pumps, but these measures likely are too expensive at the present time. The soil can be used as woodland, as wildlife habitat, or for seasonal grazing. (Capability unit Vw-1; woodland suitability group 19)

Plummer Series

The Plummer series consists of level or nearly level, deep, sandy soils that are poorly drained. These soils formed in sandy marine sediments or very old alluvium. They lie in depressions and upland areas that are scattered throughout the county but occur mainly near Pittsville and Mardela Springs. The surface layer of Plummer soils has been darkened by organic matter, and the underlying sand contains mottles, which indicate that air is lacking for long periods each year when the soil is wet. Where the soils are wooded, the native trees are wetland hardwoods and conifers, including red maple, gums, holly, and loblolly and pond pines. In areas that are rewooded or heavily cut over, loblolly pine grows in nearly pure stands.

A typical profile has a black surface layer about 1 inch thick and a dark grayish-brown subsurface layer about 7 inches thick. Both layers are loamy sand. Between the depths of 8 and 30 inches, the soil material is light brownish-gray loamy sand that is mottled with yellowish brown. Beneath this layer the material is progressively coarser in texture and paler in color with depth. It merges with white, loose, coarse sand that generally is blotched or streaked with other colors.

Generally, the Plummer soils are of little importance to farming in Wicomico County, and in most places they are forested. Except in drained areas, the soils have a high water table most of the year. They are commonly saturated to the surface much of the time, and in places they are ponded during the wettest months.

Adequate drainage is needed in fields of these soils that are farmed. Tile lines or ditches can be used, and water moves freely through them. These soils are naturally acid and low in fertility, and they must be carefully limed and fertilized if crops are to grow well. Crops benefit from irrigation during the drier part of the growing season.

Profile of Plummer loamy sand in a loblolly forest near Salisbury, near the intersection of Woodland Avenue and Fountain Road:

O1—2 to 1 inch, litter of needles and some hardwood leaves.

O2—1 inch to 0, a mat of partially decomposed organic materials mixed with some mineral material; a few fine roots.

A11—0 to 1 inch, black (10YR 2/1) heavy loamy sand; structureless (single grain); very friable; roots abundant; very strongly acid; abrupt, smooth boundary. Horizon is 1 to 2 inches thick.

A12—1 to 8 inches, dark grayish-brown (10YR 4/2) heavy loamy sand; very weak, fine, subangular blocky structure; very friable; roots plentiful; this is a regenerated A1 horizon in a reforested area; an orginal A1 horizon is thinner; strongly acid; abrupt, smooth boundary. Horizon is 6 to 9 inches thick.

C1—8 to 30 inches, light brownish-gray (2.5Y 6/2) loamy sand; common, medium, distinct mottles of yellowish brown (10YR 5/6); structureless (single grain); very friable; roots few; medium acid; abrupt, wavy boundary. Horizon is 19 to 25 inches thick.

C2g—30 to 45 inches, light-gray (5Y 7/1) sand, streaked with very dark gray (N 3/0) and grayish brown (2.5Y 5/2); structureless (single grain); loose; no roots; about 2 percent of horizon is fine smooth gravel; strongly acid; clear, wavy boundary. Horizon is 13 to 16 inches thick.

C3g—45 to 85 inches +, white (N 8/0) coarse sand; common, thick, faint streaks of pale olive (5Y 6/3); structureless (single grain); loose; no roots; about 2 percent of horizon is fine smooth gravel; strongly acid.

The A horizon is light loamy sand to heavy loamy sand. In cultivated areas the Ap horizon is generally light gray when moist and may be almost white when dry. The C horizon is mottled and streaked in some places. Where it has only a matrix color, the chroma is 0, 1, or, in a few places, 2. Generally, the Plummer soils in this county do not contain the fine gravel described in horizons C2g and C3g.

The Plummer soils formed in the same or nearly the same kind of material as the somewhat excessively drained or excessively drained Galestown and Evesboro soils, the moderately well drained or somewhat poorly drained Klej soils, the somewhat poorly drained or poorly drained Leon soils, and the very poorly drained Rutlege and St. Johns soils. Unlike the Plummer soils, the Leon soils have a Bh horizon cemented with organic matter. The A1 horizon of the Plummer soils is thinner than that of the Rutlege soils and is not quite so black.

Plummer loamy sand (Pe).—In most places this soil is level or nearly level, but in small areas it has slopes of slightly more than 2 percent. Unless the soil is drained, it is of little use except as woodland or for wildlife. Some drained areas are used for corn, truck crops, and soybeans. The soil is easily worked within a wide range of moisture content. (Capability unit IVw-6; woodland suitability group 10)

Pocomoke Series

In the Pocomoke series are deep, very poorly drained soils that lie in depressions and on broad upland flats. These soils formed in old deposits of sandy material containing a considerable amount of silt or clay, or both. Their largest acreage is in the northwestern quarter of the county, mainly in the Eastern Shore Experimental Forest. The native vegetation is wetland hardwoods, together with pond and loblolly pines. In some places the Pocomoke soils are covered with water much of the year, but in other places there is commonly a dense cover of shrubs, briers, and pawpaw. Some areas are in natural stands of wild blueberries. In cultivated fields these soils appear as black areas crossed by many ditches.

In a typical profile the surface layer is black sandy loam about 13 inches thick. Just below is a subsurface layer of gray sandy loam about 5 inches thick. The subsoil is gray or light gray throughout; it consists of sandy clay loam in the upper part and sandy loam below a depth of about 29 inches. Beginning at about 33 inches are stratified layers of gray or light-gray material. Some of the layers are sticky loam, but most of them are loose sand or loamy sand.

The Pocomoke soils are fairly extensive in this county. About 30 percent of their acreage is farmed, and the rest is in trees. Where these soils are drained, they are suited to most crops grown in the county. They have a high available water capacity and a moderate capacity for storing plant nutrients. In spring, however, the soils warm up

slowly and planting may be delayed. Wooded areas provide good habitat for wildlife.

Profile of Pocomoke sandy loam in a rewooded area on Seymore Road, about 1.2 miles south of Dick Rum Road, in the Eastern Shore Experimental Forest:

O1—2 to 1 inch, litter of pine needles, hardwood leaves, and twigs.

O2—1 inch to 0, mat of partially decomposed organic material mixed with some mineral material; many fine roots.

A1—0 to 13 inches, black (10YR 2/1) sandy loam; very weak, fine, granular structure; very friable when moist, slightly plastic and slightly sticky when wet; a few woody and many fibrous roots; very strongly acid; clear, irregular boundary. Horizon is 11 to 16 inches thick.

A2g—13 to 18 inches, gray (5Y 5/1) sandy loam; weak, fine, subangular blocky structure; very friable when moist, slightly plastic and slightly sticky when wet; a few fine roots; very strongly acid; clear, wavy boundary. Horizon is 4 to 6 inches thick.

B2tg—18 to 29 inches, gray or light-gray (5Y 6/1) light sandy clay loam; some streaks of dark gray (5Y 4/1); weak, fine and medium, blocky structure; friable when moist, slightly plastic and slightly sticky when wet; a few fine roots; very strongly acid; abrupt, wavy boundary. Horizon is 10 to 14 inches thick.

B3g—29 to 33 inches, gray or light-gray (5Y 6/1) sandy loam; very weak, fine and medium, subangular blocky structure; very friable when moist, slightly plastic and slightly sticky when wet; very few roots; very strongly acid; clear, wavy boundary. Horizon is 4 to 8 inches thick.

C1g—33 to 56 inches, light-gray (5Y 7/1) loamy sand; structureless; loose; a very few roots; very strongly acid; abrupt, smooth boundary. Horizon is 20 to 24 inches thick.

IIC2g—56 to 60 inches, gray (5Y 5/1) loam; very weak, fine, granular structure; friable when moist, sticky and slightly plastic when wet; no roots; distinct odor of hydrogen sulfide; very strongly acid; abrupt, smooth boundary. Horizon is 3 to 5 inches thick.

IIIC3g—60 to 70 inches, light-gray (5Y 7/1) fine sand; structureless; loose; no roots; strongly acid.

The A horizon is sandy loam or loam, and in wooded areas the surface is somewhat mucky because it is so rich in organic matter. In areas where the A horizon is loam, the B2tg horizon is heavy sandy clay loam. The IIC2g horizon or the IIIC3g horizon, or both, may be lacking within a 5- or 6-foot depth. In some areas, particularly those in cultivation, the surface horizon is very dark gray, likely because its organic-matter content has been lowered. All horizons below the A1, or the Ap, horizon may be mottled with shades of gray, yellow, yellowish brown, or strong brown. In places there is dark streaking caused by translocated silt or organic matter, or both, in root channels and along structural faces.

The Pocomoke soils are more poorly drained and have a darker A horizon than the Sassafras, Woodstown, and Fallsington soils, all of which developed in the same or nearly the same kind of material. The Pocomoke soils resemble the Bayboro and Portsmouth soils in morphology and drainage, but they lack the Bt horizon of clay, silty clay, or fine sandy clay that characterizes the Bayboro soils, and their Bt horizon is not quite so fine textured as that of the Portsmouth soils.

Pocomoke loam (Pk).—This soil is practically level in most places, but it has slopes of little more than 2 percent in a few areas. Its profile is slightly finer textured throughout than that described as typical for the series. The surface layer contains more silt and less sand than the typical one, and the subsoil generally contains a little more silt and clay and is somewhat more sticky when wet.

This soil is important to farming in the county. Erosion normally is only a slight hazard, but artificial drainage is needed for nearly all crops. The soil warms up slowly in spring. (Capability unit IIIw-7; woodland suitability group 1)

Pocomoke sandy loam (Po).—This soil has the profile described as typical for the series. Most of the soil is level or nearly level, and there is little or no hazard of erosion, but drainage must be improved before crops can be successfully grown. Because the soil is somewhat more sandy than Pocomoke loam, it warms up more quickly, is easier to work, and is somewhat easier to drain. Tile lines function well if they are properly installed. Drained areas are suited to corn and soybeans. Most undrained areas are used as woodland, which commonly includes good stands of loblolly pine. (Capability unit IIIw-6; woodland suitability group 1)

Portsmouth Series

The Portsmouth series consists of very poorly drained, loamy soils that occupy upland flats and depressions. These soils developed in a thin mantle of silt, possibly loess, underlain by sandy material. They occur mainly in areas west of Wango and in small, isolated spots within Poplar Hill Swamp. The native vegetation is mainly wetland hardwoods. Gums, red maple, and water-tolerant oaks are the principal trees, but pond and loblolly pines are common, and there is an understory of shrubs and briers. Where the Portsmouth soils are cultivated, they appear as black areas crossed by many ditches.

A typical profile has a black silt loam surface layer about 11 inches thick. The next layer is dark-gray silt loam about 5 inches thick. It overlies a subsoil of gray or light-gray silt loam or silty clay loam that is mottled with yellowish brown and is sticky when wet. The subsoil extends to a depth of about 32 inches. It is underlain by light-gray, almost loose loamy sand that is mottled or streaked with yellowish brown.

The Portsmouth soils generally are still wooded. They are wet most of the year and may be ponded late in winter and early in spring. These soils normally are difficult to drain, but adequate drainage must be provided for all kinds of crops. Open ditches are more suitable than tile lines, which commonly do not function properly. Although the soils warm up slowly in spring, they are well supplied with organic matter and have a high capacity for absorbing and holding moisture available to plants. They are very strongly acid but are moderately high in natural fertility. If these soils are adequately drained, limed, and fertilized, they are well suited to corn and soybeans.

Profile of Portsmouth silt loam, in a level wooded area on the south side of Walnut Tree Road, about 1 mile northeast of Upper Ferry Road north of Allen:

O1—3 to 2 inches, a litter of needles and hardwood leaves.

O2—2 inches to 0, a thick mat of partially decomposed organic materials mixed with some mineral material; abundant fine roots.

A11—0 to 11 inches, black (10YR 2/1) silt loam; weak, fine, granular structure; friable when moist, slightly plastic and slightly sticky when wet; roots plentiful; very strongly acid; clear, wavy boundary. Horizon is 9 to 13 inches thick.

A12—11 to 16 inches, dark-gray (10YR 4/1) silt loam; weak, fine to medium, subangular blocky structure; friable when moist, slightly plastic and slightly sticky when wet; rather few roots; very strongly acid; clear, smooth boundary. Horizon is 4 to 8 inches thick.

B1g—16 to 20 inches, gray or light-gray (5Y 6/1) heavy silt loam; common, fine, prominent mottles of yellowish brown (10YR 5/8); weak, medium, subangular blocky structure; firm when moist, plastic and slightly sticky when wet; very few roots; very strongly acid; clear, smooth boundary. Horizon is 2 to 5 inches thick.

B2tg—20 to 32 inches, gray or light-gray (5Y 6/1) silty clay loam; common, fine, prominent mottles of yellowish brown (10YR 5/8); weak, coarse, blocky structure; firm when moist, plastic and sticky when wet; very few fine roots; distinct clay films; very strongly acid; abrupt, wavy boundary. Horizon is 11 to 17 inches thick.

IICg—32 to 55 inches +, light-gray (5Y 7/1) loamy sand; common, medium, prominent mottles of yellowish brown (10YR 5/8); structureless (single grain); very friable when moist, slightly sticky when wet; no roots; some lenses of gray or light-gray (5Y 6/1), unmottled, slightly plastic silty material; strongly to very strongly acid.

The A horizon is sandy loam or silt loam. In wooded areas the surface is commonly somewhat mucky because it is covered with so much organic matter. In some places there is a thin, transitional B3g horizon of loam or sandy clay loam. Also, within a 60-inch depth, there may be a IIIC horizon, and even a IVC horizon, of various materials and textures. In cultivated fields the Ap horizon generally is black or very dark gray. Most of the mottling in the B1g and B2tg horizons is along old root channels, and in many places these are filled with dark-gray silty material. The solum ranges from 27 to 40 inches in thickness.

The Portsmouth soils developed in the same or nearly the same kind of material as the well drained Matapeake soils, the moderately well drained Mattapex soils, and the poorly drained Othello soils. The Portsmouth soils have a more silty and more slowly permeable Bt horizon than the similar Pocomoke soils, but their Bt horizon is neither so fine textured nor so slowly permeable as that of the Bayboro soils.

Portsmouth sandy loam (Pr).—The surface horizon of this soil contains more sand than that of the profile described as typical of the series, apparently because it was covered with a layer of sand laid down by wind or water.

This soil warms up more quickly than Portsmouth silt loam and is more easily drained and worked. It is level or nearly level and normally is not subject to erosion. About 30 percent of the acreage is cultivated, and the rest is wooded. (Capability unit IIIw–6; woodland suitability group 1)

Portsmouth silt loam (Pt).—This soil has the profile described as typical for the series. The soil occurs mainly in depressions within Poplar Hill Swamp. It is level or nearly level and ordinarily is subject to no erosion, but it is more difficult to drain, to work, and to manage than Portsmouth sandy loam. Only a small acreage is used for farming, and the rest remains in wetland forest. (Capability unit IIIw–7; woodland suitability group 1)

Rutlege Series

In the Rutlege series are very poorly drained, sandy soils that have a very dark gray to black surface layer. These soils formed in sandy marine sediments or very old alluvial sediments. The largest areas are near Mardela Springs. In native woodland the trees are chiefly red maple, gum, water-tolerant oaks, pond pine, and loblolly pine. Also, there is commonly an understory of holly, pawpaw, blueberry, and briers. Where the Rutlege soils have not been drained, the water table is high and depressions resemble swamps. Cultivated fields generally appear as dark areas that are crossed by many ditches.

In a typical profile the surface layer, about 10 inches thick, is black loamy sand that shows some grains of white sand. The subsurface layer is very dark gray or very dark grayish-brown loamy sand about 14 inches thick. It is underlain by loose sand that is grayish brown in the upper part but grades to white at a depth of about 40 inches.

Unless the Rutlege soils are drained, they are of little use except as woodland. About three-fourths of their acreage is covered with trees. Excess water can be removed by ditching or tiling. Drained areas are suitable for cultivation.

Profile of Rutlege loamy sand, in a depressional wooded area on U.S. Highway 50, about 0.3 miles west of Riverton Road, northwest of Mardela Springs:

O1—2 to ½ inch, litter of loblolly pine needles and hardwood leaves.

O2—½ inch to 0, mat of decomposed organic materials; many fine roots.

A11—0 to 10 inches, black (N 2/0) light loamy sand; structureless (single grain); loose to very friable; roots abundant; some grains of clean white sand; extremely acid; clear, wavy boundary. Horizon is 8 to 11 inches thick.

A12—10 to 16 inches, very dark gray (10YR 3/1) light loamy sand; structureless (single grain); loose to very friable; few roots; some grains of clean white sand; extremely acid; clear, irregular boundary. Horizon is 3 to 6 inches thick.

A13—16 to 24 inches, very dark grayish-brown (10YR 3/2) light loamy sand; structureless (single grain); loose; few roots; some small inclusions of dark-brown (7.5YR 3/2), rather firm, weakly cemented loamy sand; extremely acid; clear, irregular boundary. Horizon is 4 to 8 inches thick.

C1—24 to 31 inches, grayish-brown (2.5Y 5/2) sand; structureless (single grain); loose; very few roots; very strongly acid; diffuse boundary; indeterminate range in thickness.

C2g—31 to 40 inches, light-gray (5Y 7/1) sand; structureless (single grain); loose; no roots; very strongly acid; diffuse boundary; indeterminate range in thickness.

C3g—40 to 50 inches +, white (5Y 8/1) sand; structureless (single grain); loose; no roots; very strongly acid.

In undisturbed wooded areas the surface commonly is somewhat mucky. The C2g and C3g horizons may contain some fine, smooth gravel. In cultivated areas the Ap horizon is generally black but in places is very dark gray, very dark brown, or very dark grayish brown. The C horizon commonly is mottled with yellow or strong brown, and it may be streaked with white, or, because of infiltrated organic matter, with various shades of gray.

The Rutlege soils developed in the same or nearly the same kind of material as the somewhat excessively drained or excessively drained Galestown and Evesboro soils, the moderately well drained or somewhat poorly drained Klej soils, the somewhat poorly drained or poorly drained Leon soils, the poorly drained Plummer soils, and the very poorly drained St. Johns soils. In contrast to the Rutlege soils, the St. Johns and Leon soils have a Bh horizon cemented with organic matter. The Rutlege soils are similar to the Bayboro, Portsmouth, and Pocomoke soils in drainage and color, but they are coarser textured than all of those soils and do not have a Bt horizon. Rutlege soils are more poorly drained than the Plummer soils, and they have a thicker and darker A horizon.

Rutlege loamy sand (Ru).—This soil is level or nearly level in most places but is gently sloping in a few. Its use is limited by very poor drainage (fig. 11), strong to extreme acidity, and sandiness. After the soil is drained, it is suited to truck crops, corn, and soybeans. In addition, blueberries can be produced. If the growing season is very dry, however, plants are unable to obtain sufficient moisture in areas

Figure 11.—Water standing on Rutlege loamy sand in an undrained area just north of Athel.

that have been drained and crops grown in these areas benefit from irrigation. Lime and a large amount of fertilizer are needed for a good growth of crops. (Capability unit IVw-6; woodland suitability group 10)

Sassafras Series

Soils of the Sassafras series are level to strongly sloping, deep, and well drained. They formed on marine terraces or very old alluvial terraces that consist of sandy material containing a considerable amount of silt, clay, or both. The Sassafras soils occur mainly in small areas scattered throughout most of Wicomico County. A few larger areas are near Hebron. Where the soils are wooded, the native trees are mostly oaks, beech, and other hardwoods, but loblolly pine grows in nearly pure stands in many cutover or second-growth areas. Cultivated fields of Sassafras soils appear as dark grayish-brown areas unbroken by drainage ditches.

A typical profile has a surface layer of dark grayish-brown fine sandy loam about 10 inches thick. The subsoil, to a depth of about 15 inches, is yellowish-brown fine sandy loam. The middle part of the subsoil is brown sandy clay loam that is rather sticky when wet. It extends to a depth of about 28 inches. Below that depth the subsoil is strong-brown sandy loam. Beginning at about 34 inches, the underlying material is massive, yellowish-brown sandy loam that grades to loose, brownish-yellow loamy sand.

The Sassafras soils are not extensive in Wicomico County, but they are important to farming locally. In fields that are properly limed and fertilized, the soils are well suited to all crops commonly grown. They are easily tilled, have a high capacity for holding moisture available to plants, and are readily penetrated by air, water, and roots.

Profile of Sassafras fine sandy loam, 0 to 2 percent slopes, in an idle area on the east side of Whiton-Snow Hill Road, about 0.1 mile north of Whiton-Queponco Road, south of Powellville:

O1—1 inch to 0, a close mat of dead grasses and weeds.

Ap—0 to 10 inches, dark grayish-brown (10YR 4/2) fine sandy loam; weak, fine and medium, granular structure; friable when moist, slightly plastic and slightly sticky when wet; roots plentiful; neutral (limed); abrupt, smooth boundary. Horizon is 10 to 11 inches thick.

B1—10 to 15 inches, yellowish-brown (10YR 5/4) heavy sandy loam (sand particles are fine); very weak, fine and medium, subangular blocky structure; friable when moist, slightly plastic and slightly sticky when wet; rather few roots; neutral; clear, smooth boundary. Horizon is 4 to 6 inches thick.

B2t—15 to 28 inches, brown (7.5YR 5/4) sandy clay loam; weak, fine and medium, subangular blocky structure; friable when moist, slightly plastic and rather sticky when wet; few roots; some thin but distinct clay coatings; slightly acid; clear, smooth boundary. Horizon is 11 to 14 inches thick.

B3—28 to 34 inches, strong-brown (7.5YR 5/6) heavy sandy loam; weak, fine, subangular blocky structure; friable when moist, slightly plastic and slightly sticky when wet; very few roots; about 1 percent of horizon is fine smooth gravel; slightly acid; clear, smooth boundary. Horizon is 5 to 8 inches thick.

C1—34 to 45 inches, yellowish-brown (10YR 5/6) light sandy loam; massive (structureless) to very weak, fine to medium, subangular blocky structure; very friable when moist, nonplastic but slightly sticky when wet; no roots; about 5 percent of horizon is fine smooth gravel; medium acid; abrupt, smooth boundary. Horizon is 10 to 12 inches thick.

IIC2—45 to 67 inches +, brownish-yellow (10YR 6/6), loose loamy sand; structureless; no roots; about 2 percent of horizon is fine smooth gravel; very strongly acid.

The A horizon is sandy loam or fine sandy loam. The B2t horizon generally is sandy clay loam, but in some places it is loam or heavy sandy loam. In places the C and IIC horizons include lenses or pockets of fine-textured material. In undisturbed wooded areas these soils have a thin, dark grayish-brown A1 horizon and a somewhat thicker, grayish-brown to light yellowish-brown A2 horizon. The hue of the B horizon ranges from 10YR to 5YR but is mostly 7.5YR. Locally, the upper few inches of the C1 horizon is somewhat compact, brittle, and variegated. This condition, however, is usually noted only when the entire profile is dry. Normally, the Sassafras soils are strongly acid or very strongly acid. The solum ranges from 30 to 40 inches in thickness.

The Sassafras soils developed in the same or somewhat the same kind of material as the moderately well drained Woodstown soils, the poorly drained Fallsington soils, and the very poorly drained Pocomoke soils. Sassafras soils are more sandy throughout the solum, and commonly contain coarser sand grains, than the Matapeake soils, which are similar to the Sassafras soils in morphology but have a more silty Bt horizon. The Sassafras soils contain more silt and clay than the Downer and Norfolk soils, all of which have a thicker and coarser textured A horizon and a coarser textured Bt horizon than the Sassafras soils.

Sassafras fine sandy loam, 0 to 2 percent slopes (SaA).—This soil has the profile described as typical for the Sassafras series. In Wicomico County it is one of the better soils for farming and for many nonfarm uses. It is well suited to corn, soybeans, and truck crops. The soil is easily worked, is well drained, holds moisture well, has moderately high fertility, and is so nearly level that erosion generally is not a hazard. (Capability unit I-5; woodland suitability group 7)

Sassafras fine sandy loam, 2 to 5 percent slopes (SaB).—This soil is more susceptible to erosion than Sassafras fine sandy loam, 0 to 2 percent slopes, and in a few areas a significant amount of its original surface layer has been washed away. Slopes generally are long and smooth.

The main concern of management is controlling erosion. (Capability unit IIe–5; woodland suitability group 7)

Sassafras sandy loam, 0 to 2 percent slopes (SsA).—This soil is the most extensive of the Sassafras series and is one of the most important soils for farming in the county. In some places it has a slightly finer textured, less sticky subsoil than the soil described as typical for the series.

This soil is well suited to corn, soybeans, and many kinds of truck crops. It is easily worked, is well drained but holds a moderate amount of moisture available to plants, and is so nearly level that it is subject to little or no water erosion. Cover cropping in winter helps to maintain the organic-matter content and to protect the surface from soil blowing. (Capability unit I–5; woodland suitability group 7)

Sassafras sandy loam, 2 to 5 percent slopes, moderately eroded (SsB2).—This soil is one of the better soils in the county and is suited to all crops commonly grown. In most areas, however, it has lost a large part of its original surface layer through water erosion or soil blowing. Controlling erosion is the main concern of management. The soil should be tilled on the contour and farmed in a rotation that helps to check soil losses. (Capability unit IIe–5; woodland suitability group 7)

Sassafras sandy loam, 5 to 10 percent slopes, moderately eroded (SsC2).—This soil generally has short, irregular slopes. In most places it has lost a considerable amount of its original surface layer through erosion. The soil commonly occurs in small areas surrounded by other soils that are more easily managed. Included in mapping are a few, scattered areas where erosion has been severe and the subsoil is exposed. Also included are spots in which the surface layer is finer textured than normal.

Erosion can be controlled on this soil if management is good and if conservation measures are carefully applied. (Capability unit IIIe–5; woodland suitability group 8)

St. Johns Series

The St. Johns series consists of very poorly drained, sandy soils that have a thick, black surface layer and a dark-brown, cemented, sandy subsoil. Locally, the cemented subsoil is called hardpan, Indian hearth, or ironstone. The St. Johns soils developed in thick beds of acid sand or loamy sand. They occur mainly in the eastern part of the county, where their largest acreage is near Pittsville. Red maple, gums, and wetland oaks are the principal native trees, though pond pine also is common. Loblolly pine forms almost pure stands in reforested or heavily cutover areas. The understory is made up of blueberry, bays, sedges, greenbrier, and teaberry.

In a typical profile the surface layer is black loamy sand about 14 inches thick. The upper part of the subsoil, to a depth of about 25 inches, is brown and dark-brown, crumbly loamy sand. The lower part of the subsoil is a pan cemented with organic matter. It consists of brown to very dark grayish-brown loamy sand that is firm to hard regardless of moisture content. Beneath the subsoil is light brownish-gray and light-gray soil material that varies from sand to silt loam in texture but is progressively looser with depth.

About half the total acreage of St. Johns soils in the county has been cleared and is used for farming. In many of the areas not farmed, the cemented pan is closer to the surface than the one described in the preceding paragraph. Unless these soils are drained, they are saturated with water most of the year and may be ponded at times. On the other hand, plants are frequently injured by a lack of sufficient moisture in dry periods.

Profile of St. Johns loamy sand, in a blueberry planting near U.S. Highway 50, about 1.4 miles west of Pittsville:

Ap—0 to 14 inches, black (10YR 2/1) loamy sand; structureless (single grain); very friable; few roots; very strongly acid; abrupt, smooth boundary. Horizon is 10 to 16 inches thick.

B1h—14 to 25 inches, brown (10YR 5/3) and dark-brown (7.5YR 3/2) loamy sand; weak, medium, subangular blocky structure to single grain (structureless); friable; very few roots; very strongly acid; abrupt, smooth boundary. Horizon is 7 to 13 inches thick.

B2h—25 to 35 inches, brown (10YR 5/3) to very dark grayish-brown (10YR 3/2) loamy sand; generally massive (structureless), but some evidence of angular blocks; extremely firm when moist; no roots; very strongly acid; abrupt, smooth boundary. Horizon is 7 to 11 inches thick.

IIC1g—35 to 40 inches, light brownish-gray (2.5Y 6/2) silt loam; weak, fine to medium, granular structure; friable to firm when moist, slightly plastic and slightly sticky when wet; no roots; very strongly acid; abrupt, smooth boundary. Horizon is 5 to 6 inches thick.

IIIC2g—40 to 58 inches +, light-gray (2.5Y 7/2) sand, structureless (single grain); loose; no roots; very strongly acid.

In small areas, especially those in depressions, the surface horizon has a high organic-matter content and is mucky. The IIC horizon ranges from silt loam to sand in texture. In some places the Ap horizon is very dark gray, very dark grayish brown, or very dark brown. Grains of clean white sand are common in the A horizon. In unplowed areas, as well as in some that have been plowed, a light-gray A2 horizon a few inches thick lies directly below the A1, or the Ap, horizon. The Bh horizon varies considerably in hardness and thickness. Generally, the cemented pan is hardest during the driest part of the summer. In some areas it is soft enough to be penetrated by roots in winter and spring, but it is almost impermeable in summer. The thickness of the solum generally ranges from 24 to 36 inches.

The St. Johns soils developed in the same or nearly the same kind of material as the somewhat excessively drained or excessively drained Galestown and Evesboro soils, the moderately well drained or somewhat poorly drained Klej soils, the somewhat poorly drained or poorly drained Leon soils, the poorly drained Plummer soils, and the very poorly drained Rutlege soils. The St. Johns soils, like the Rutlege soils, have a thick, black A horizon but, in contrast to those soils, have a Bh horizon cemented with organic matter. The Leon soils also have a cemented Bh horizon, but they are not so poorly drained as the St. Johns soils, and their A horizon is gray instead of black.

St. Johns loamy sand (St).—This nearly level soil is the more extensive St. Johns soil in the county and has the profile described for the series. In some places it occupies wide, level areas that are bounded by sandy ridges. Included in mapped areas are a few spots of Rutlege soils in which a brown, cemented layer is lacking.

Wetness is the main limitation that affects use of this soil. Cultivated crops generally are not suited, though corn, soybeans, cucumbers, blueberries, and strawberries are grown in some areas. Woodland or wildlife habitat is a more suitable use. Normally, there is no erosion hazard. (Capability unit Vw–5; woodland suitability group 10)

St. Johns mucky loamy sand (Su).—This nearly level soil contains more organic matter in its surface layer and is more susceptible to ponding than the soil having the pro-

file described for the series. The surface layer feels spongy and mucky rather than sandy, and wet material from this layer stains the hands or clothing. The soil lies mainly in depressions and in most places remains wooded. Generally, the only areas farmed are small ones that occur in fields consisting chiefly of other soils. If this soil is drained, plowed, and cropped, it loses most of its muckiness within a few years. (Capability unit Vw-5; woodland suitability group 10)

Swamp

Swamp (Sw) consists of areas that are covered by fresh water most, if not all, of the time. The soil material is so wet that it has not been classified. It is mainly clay, but some of it is mucky and some is sandy. Generally, the vegetation is a dense growth of water-tolerant hardwoods, together with a few pond pines and a few baldcypress trees. In Wicomico County the largest area of Swamp is close to Ellis Bay, south of Nanticoke.

Swamp cannot be used for farming, though some spots produce timber or, in especially dry periods, provide browsing for livestock. A more suitable use is habitat for wildlife. (Capability unit VIIw-1; woodland suitability group 21)

Tidal Marsh

Tidal marsh (Tm) occupies large areas that border the estuaries of the Wicomico and Nanticoke Rivers, and it also occurs along the lower courses of streams flowing into those rivers. The soil material has not been examined in detail, but it varies widely in texture and is more or less salty. Some areas, particularly the clayey ones, contain a large amount of sulfur compounds.

Tidal marsh is not suitable for farming at the present time. It cannot be used for crops, pasture, or woodland. About the only practical uses are wildlife habitat and some kinds of recreation. (Capability unit VIIIw-1; woodland suitability group 21)

Woodstown Series

The Woodstown series is made up of deep, level to gently sloping, moderately well drained soils that occur on uplands, mostly in the northwestern part of the county. These soils developed in marine sediments or very old alluvial sediments consisting chiefly of sand but including a considerable amount of silt, clay, or both. They have a yellowish, distinctly expressed subsoil that is mottled in the lower part. In native woodland the trees are mainly oaks, red maple, gums, beech, and loblolly pine. Where the soils were once cleared and cultivated, loblolly pine now grows in almost pure stands.

In a typical profile the surface layer is grayish-brown fine sandy loam, and the subsurface layer is light yellowish-brown fine sandy loam. These layers have a combined thickness of about 13 inches. The upper part of the subsoil is brownish-yellow sandy clay loam that is sticky when wet. It extends to a depth of about 24 inches, and it overlies a layer of olive-yellow sandy clay loam that is faintly mottled with light gray. The lower part of the subsoil, to a depth of about 40 inches, is yellowish-brown sandy loam containing light-gray mottles. This layer is underlain by loose, pale-yellow coarse sand that is mottled and streaked with white.

In Wicomico County the Woodstown soils are cultivated on about three-fourths of their total area, though a larger acreage was cleared and farmed in the past. These soils are very strongly acid unless they have been limed. They have a high available moisture capacity and a moderate capacity for holding plant nutrients. Lime and fertilizer are needed for a good growth of crops. The Woodstown soils are preferred by some growers of corn and soybeans because they hold available moisture through a longer part of the growing season than some soils that are better drained.

Profile of Woodstown fine sandy loam, 0 to 2 percent slopes, in a level wooded area on the north side of Brown Road, 0.1 mile north of Alice Hitch Road, northwest of Hebron:

O1—3 to 1 inch, litter of loblolly pine needles and hardwood leaves.

O2—1 inch to 0, mat of partially decomposed organic materials mixed with some mineral material; fine roots plentiful.

A1—0 to 2 inches, grayish-brown (10YR 5/2) fine sandy loam; very weak, fine to medium, granular structure; friable when moist, slightly plastic and slightly sticky when wet; roots abundant; strongly acid; abrupt, smooth boundary. Horizon is 1 to 4 inches thick.

A2—2 to 13 inches, light yellowish-brown (2.5Y 6/4) fine sandy loam; weak, fine to medium, subangular blocky structure; friable when moist, slightly plastic and slightly sticky when wet; roots common; very strongly acid; clear, smooth boundary. Horizon is 8 to 12 inches thick.

B21t—13 to 24 inches, brownish-yellow (10YR 6/6) sandy clay loam; moderate, fine and medium, subangular blocky structure; firm when moist, plastic and sticky when wet; a very few roots; faint discontinuous clay coatings; very strongly acid; clear, smooth boundary. Horizon is 8 to 12 inches thick.

B22t—24 to 30 inches, olive-yellow (2.5Y 6/6) light sandy clay loam; common faint mottles of light gray (2.5Y 7/2); weak, fine to medium, blocky structure; firm when moist, slightly plastic and slightly sticky when wet; very few roots; clay bridging between sand grains; very strongly acid; clear, wavy boundary. Horizon is 4 to 10 inches thick.

B3—30 to 40 inches, yellowish-brown (10YR 5/4) sandy loam; many, medium, distinct mottles of light gray (2.5Y 7/2); very weak, fine to medium, blocky structure; friable when moist, slightly plastic and slightly sticky when wet; no roots; strongly acid; gradual, smooth boundary. Horizon is 7 to 12 inches thick.

IIC—40 to 50 inches +, pale-yellow (2.5Y 7/4) coarse sand that contains streaks of white (N 8/0); structureless (single grain); loose; no roots; strongly acid.

In Wicomico County the A horizon is sandy loam, fine sandy loam, or loam. The texture of the B2t horizon is generally sandy clay loam but ranges from heavy sandy loam to heavy sandy clay loam. In areas where the A horizon is loam, the B2t horizon normally is somewhat finer textured than it is in other areas. The IIC horizon can be almost any texture, but it is generally very sandy and may contain lenses or pockets of fine-textured material. In most cultivated fields the Ap horizon is grayish brown or dark grayish brown. The solum ranges from 28 to 40 inches in thickness. It tends to be thickest, and the B2t horizon has the most strongly developed structure, in places where the A horizon is loam.

The Woodstown soils developed in the same or somewhat the same kind of material as the well-drained Sassafras soils, the poorly drained Fallsington soils, and the very poorly drained Pocomoke soils. Woodstown soils are similar to the Keyport and Mattapex soils in drainage and morphology, but their Bt horizon contains much less clay than that of the Keyport soils and much less silt than that of the Mattapex

soils. Compared with the Matawan soils, the Woodstown soils are not quite so well drained, are mottled at a lesser depth, and are not so thick in the A horizon.

Woodstown fine sandy loam, 0 to 2 percent slopes (WfA).—This soil has the profile described as typical for the series. Because the soil is nearly level and dries out fairly slowly, planting is delayed in spring, especially if the season is unusually wet. Removing excess water is the main concern of management. Normally, there is little if any hazard of erosion.

If this soil is drained, limed and fertilized, and otherwise well managed, it is well suited to most crops grown in the county. Tiling or ditching is suitable for improving drainage. (Capability unit IIw–5; woodland suitability group 3)

Woodstown fine sandy loam, 2 to 5 percent slopes (WfB).—This soil has better surface drainage than Woodstown fine sandy loam, 0 to 2 percent slopes. Nevertheless, tiling or a similar practice is commonly needed for removing excess water from the subsoil. Erosion is a hazard on this soil, and in some areas an appreciable amount of the original surface layer has been washed away. Included in mapping are a few areas where the surface layer is finer textured than normal. (Capability unit IIe–36; woodland suitability group 3)

Woodstown loam, 0 to 2 percent slopes (WoA).—The surface layer and subsoil of this soil contain somewhat less sand and more silt or clay, or both, than those of the soil having the profile described for the series. The subsoil generally is slightly thicker, is somewhat more sticky when wet, and may be slightly more mottled in the lower part than the one in that soil.

Woodstown loam, 0 to 2 percent slopes, is suited to most crops grown in the county and is an especially good soil for corn and soybeans, but it warms up later in spring than other Woodstown soils. The main concern of management is drainage, which can be improved by use of tile lines or open ditches. Normally, erosion is not a hazard. (Capability unit IIw–1; woodland suitability group 3)

Woodstown sandy loam, 0 to 2 percent slopes (WsA).—The profile of this fairly extensive soil contains coarser sand grains in the surface layer and generally a little less silt and clay in the subsoil than that described as typical for the series. Also, this soil can be drained and worked a little more easily than Woodstown loam and fine sandy loams, and usually it is ready for planting a few days earlier in spring. Removing excess water is the chief concern of management. Normally, there is little or no hazard of erosion.

If this soil is drained, limed and fertilized, and otherwise properly managed, it is well suited to most crops grown in the county. Tile lines function well in draining this soil. (Capability unit IIw–5; woodland suitability group 3)

Woodstown sandy loam, 2 to 5 percent slopes (WsB).—This soil has adequate surface drainage, but tiling or a similar drainage practice is generally needed for removing excess water from the subsoil. Erosion is a hazard, and in some areas a part of the original surface layer has been washed away. Included in mapped areas are a few small depressions and a few spots where slopes are greater than 5 percent. (Capability unit IIe-36; woodland suitability group 3)

Use and Management of Soils

The first part of this section explains how soils are grouped according to their capability and describes the capability units in Wicomico County. The second part deals with practices of management that are suitable for all the soils in the county. In the third part there are estimates of average yields of the principal crops grown in the county under improved management. Other parts describe the use of soils as woodland, discuss wildlife, explain engineering uses of soils, and discuss the use of soils in community development.

Capability Groups of Soils

Capability classification is a grouping of soils to show, in a general way, their suitability for most kinds of farming. It is a practical classification based on limitations of the soils, the risk of damage when they are used, and the way they respond to treatment. The classification does not apply to most horticultural crops, or to rice and other crops that have their own special requirements. The soils are classified according to degree and kind of permanent limitation, but without consideration of major and generally expensive landforming that would change the slope, depth, or other characteristics of the soils; and without consideration of possible but unlikely major reclamation projects.

In the capability system, all kinds of soils are grouped at three levels, the capability class, subclass, and unit. These are discussed in the following paragraphs.

Capability Classes, the broadest grouping, are designated by Roman numerals I through VIII. The numerals indicate progressively greater limitations and narrower choices for practical use. Classes are defined as follows:

Class I. Soils have few limitations that restrict their use.

Class II. Soils have some limitations that reduce the choice of plants or require moderate conservation practices.

Class III. Soils have severe limitations that reduce the choice of plants, require special conservation practices, or both.

Class IV. Soils have very severe limitations that restrict the choice of plants, require very careful management, or both.

Class V. Soils are subject to little or no erosion but have other limitations, impractical to remove, that limit their use largely to pasture, range, woodland, or wildlife food and cover.

Class VI. Soils have severe limitations that generally make them unsuited to cultivation and limit their use largely to pasture or range, woodland, or wildlife food and cover.

Class VII. Soils have very severe limitations that make them unsuited to cultivation and restrict their use largely to grazing, woodland, or wildlife.

Class VIII. Soils and landforms have limitations that preclude their use for commercial plant production and restrict their use to recreation, wildlife, or water supply, or to esthetic purposes.

CAPABILITY SUBCLASSES are soil groups within one class; they are designated by adding a small letter, *e*, *w*, *s*, or *c*, to the class numeral, for example IIe. The letter *e* shows that the main limitation is risk of erosion unless close-growing plant cover is maintained; *w* shows that water in or on the soil interferes with plant growth or cultivation (in some soils the wetness can be partly corrected by artificial drainage); *s* shows that the soil is limited mainly because it is shallow, droughty, or stony; and *c*, used in some parts of the United States but not in Wicomico County, shows that the chief limitation is climate that is too cold or too dry.

CAPABILITY UNITS are soil groups within the subclasses. The soils in one capability unit are enough alike to be suited to the same crops and pasture plants, to require similar management, and to have similar productivity and other responses to management. Thus, the capability unit is a convenient grouping for making many statements about the management of soils. Capability units are generally designated by adding an Arabic numeral to the subclass symbol, for example, IIe–5 or IIIs–1. Thus, in one symbol, the Roman numeral designates the capability class or degree of limitation, and the small letter indicates the subclass, or kind of limitation as defined in the foregoing paragraph. The Arabic numeral specifically identifies the capability unit within each subclass.

In the following pages, the capability units in Wicomico County are described and suggestions for the use and management of the soils are given. The units are not numbered consecutively, because a statewide system is used for numbering the capability units in Maryland and not all of the units in the system are represented in this county. To find the names of the soils in any given capability unit, refer to the "Guide to Mapping Units" at the back of this soil survey.

CAPABILITY UNIT I–4

The only soil in this unit is Matapeake silt loam, 0 to 2 percent slopes. This medium-textured soil occupies uplands and is deep and well drained. It retains moisture well and is fairly easy to work.

The soil in this unit is excellent for general crops (fig. 12), forage crops, pasture, orchards, and some kinds of truck crops. If it is well managed, it can be cultivated intensively. Good management includes keeping tillage to a minimum, using all crop residues, liming as needed, and including legumes and green-manure crops in the rotation. Neither artificial drainage nor special practices for controlling erosion are needed.

CAPABILITY UNIT I–5

This unit consists of nearly level, moderately coarse textured soils on uplands that are deep and well drained. These soils have a more sandy surface layer than the soil in unit I–4, and they are more easily worked throughout a wider range of moisture content, but they are somewhat less productive than that soil.

The soils in this unit are well suited to most of the common crops, and they are especially good for truck crops. They can be kept productive if they are limed, are adequately supplied with plant nutrients, and are farmed in a rotation that includes cover crops of grasses and legumes. All crop residues should be returned to the soil.

Figure 12.—**Soybeans in foreground, and corn in background, on Matapeake silt loam, 0 to 2 percent slopes. This soil is in capability unit I–4.**

Special practices for controlling erosion are not needed, but tillage should be kept to a minimum.

CAPABILITY UNIT IIe–4

The only soil in this unit is Matapeake silt loam, 2 to 5 percent slopes, moderately eroded. This deep, well-drained soil occurs on uplands. It retains moisture well and is fairly easy to work, but it is moderately susceptible to erosion.

This soil is well suited to general crops, forage crops, pasture, orchards, and some kinds of truck crops. It has better air drainage that makes it more desirable for orchards than the Matapeake soil in unit I–4. Among the practices that reduce runoff and control erosion are contour tillage, the use of all crop residues, and minimum tillage. A suitable crop rotation is one that is at least 3 years long and includes a hay crop or another close-growing crop at least two-thirds of the time. Rotation grazing is a good practice in areas where the soil is used for pasture.

CAPABILITY UNIT IIe–5

In this unit are gently sloping, moderately coarse textured soils that are deep and well drained. These soils occupy uplands, where erosion is a moderate hazard. Some of the soils are moderately eroded.

The soils in this unit are well suited to most of the common crops, especially truck crops. Their plow layer is more sandy and is more easily worked than that of the soil in capability unit IIe–4. A suitable crop rotation is one that is at least 3 years long and includes only one clean-tilled crop in that time. Erosion can be reduced by farming in strips on the contour and by keeping the surface covered with plants as much of the time as possible. Diversion terraces having safe outlets are needed on long slopes, and natural drainageways should be kept sodded.

CAPABILITY UNIT IIe–13

The only soil in this unit is Keyport silt loam, 2 to 5 percent slopes. This gently sloping soil occupies uplands

and is moderately well drained. It has a subsoil that is clayey, sticky when wet, and slowly permeable.

This soil is too wet at some times and too dry at others. Excess water is a limitation, particularly early in spring, and planting dates may be delayed. Nevertheless, runoff is so rapid that controlling erosion is more important than improving drainage. If soil losses are checked and drainage is improved, the soil can be used for most crops grown locally, but it is not well suited to plants that may be damaged by frost heaving in winter. A good supply of plant nutrients is needed, and lime is commonly required in fields used for crops.

CAPABILITY UNIT IIe-16

This unit consists of gently sloping, medium-textured, moderately well drained soils on uplands. These soils are moderately susceptible to erosion. Permeability in their subsoil is moderately slow.

Controlling erosion is the main concern in the management of these soils. In some areas, however, tile drains are needed for removing excess water. The soils are more easily drained and managed than the Keyport soil in unit IIe-13. Drained areas can be used for most crops grown locally, but they are not well suited to plants that may be damaged by frost heaving in winter.

CAPABILITY UNIT IIe-36

In this unit are gently sloping, moderately coarse textured, moderately well drained soils that have a moderately permeable to slowly permeable subsoil. These soils occur on uplands.

The soils in this unit are easy to work and generally are easy to drain. Tile lines or ditches can be used for disposing of excess water, but wetness may delay planting of crops in spring. If erosion is controlled and if drainage is improved as needed, these soils are suited to most crops. In winter, however, some perennial plants may be damaged by frost heaving.

CAPABILITY UNIT IIw-1

This unit consists of medium-textured, moderately well drained soils on uplands. These moderately wet soils have a subsoil in which permeability is moderate or moderately slow. They are nearly level and subject to little or no erosion.

If the soils in this unit are adequately drained, they are suited to most crops, and they are not difficult to drain. Tile lines or open ditches can be used for disposing of excess water. Some perennial crops may be damaged by frost heaving in winter, and planting dates are frequently delayed in spring, for the soils dry out and warm up more slowly than better drained soils.

CAPABILITY UNIT IIw-5

Woodstown fine sandy loam, 0 to 2 percent slopes, is the only soil in this unit. This soil occupies uplands and is moderately well drained. Permeability in the subsoil is moderate.

If drainage is adequate, the soil in this unit is suited to most crops. Generally, it is more easily drained and worked than Woodstown soils having a finer textured surface layer and a less permeable subsoil. Tile drains function well, but ditches also are suitable. Some perennial crops grown on this soil are commonly damaged by frost heaving in winter. Because the soil dries out and warms up slowly, planting may be delayed in spring.

CAPABILITY UNIT IIw-8

The only soil in this unit is Keyport silt loam, 0 to 2 percent slopes. This moderately well drained soil occurs on uplands. It has a slowly permeable subsoil and a seasonally high water table, and it is cold and wet in spring.

The improvement of drainage is the main concern, but the soil generally is difficult to drain because water moves so slowly through the subsoil. Properly spaced ditches should be used for removing excess water, as tile lines do not function well in the tight subsoil. Under good management, the soil is suited to corn, soybeans, pasture, and some other crops. It should be cultivated within only a narrow range of moisture content, for heavy machinery compacts the surface layer if it contains much moisture. Crops planted late in spring normally are preferred to those planted earlier. If winter is severe, perennial plants are damaged by frost heaving.

CAPABILITY UNIT IIw-10

In this unit are nearly level, moderately well drained soils that have a thick, sandy surface layer. Permeability is slow or moderately slow in the subsoil.

Improving drainage is the main concern of management. The soils are easily drained and worked, but they do not retain plant nutrients well and must be adequately limed and fertilized if they are to be kept productive. Tile drains function satisfactorily, and open ditches also are suitable. Although water erosion is only a slight hazard, soil blowing is likely in fields where a loose, dry surface layer is left unprotected. Windbreaks are useful in reducing the risk of soil blowing, and the surface should be protected with growing plants or crop residues in dry, windy periods.

CAPABILITY UNIT IIs-4

This unit consists of deep, somewhat excessively drained soils that have a thick, sandy surface layer and a somewhat finer textured, moderately permeable subsoil. These nearly level and gently sloping soils lie on uplands. Some areas are moderately eroded.

The soils in this unit warm up early in spring and are suited to the earliest crops, especially truck crops. They are seasonally droughty, however, and management is needed that conserves moisture and plant nutrients. A large amount of fertilizer is generally needed for most crops, and supplemental irrigation is desirable in dry periods. Because the sandy surface layer tends to blow when dry, it should be protected by a plant cover much of the time. Windbreaks help to check soil blowing in some places. Runoff can be reduced and water erosion controlled by tilling on the contour and by growing cultivated crops in alternate strips with close-growing crops.

CAPABILITY UNIT IIIe-4

Only Matapeake silt loam, 5 to 10 percent slopes, is in this unit. It is a deep, well-drained soil on uplands and is highly susceptible to erosion.

This soil is well suited to general crops, forage crops, pasture, orchards, and some kinds of truck crops. Conserving soil and water is the main concern of management. Crops should be grown in a rotation that keeps the soil protected

by close-growing crops at least three-fourths of the time. Other measures needed for erosion control are minimum tillage, contour stripcropping, and sodded diversion terraces and waterways. In areas used for orchards, the trees should be planted on the contour and the soil surface covered with a green-manure crop or a cover crop most of the time.

CAPABILITY UNIT IIIe-5

The only soil in this unit is Sassafras sandy loam, 5 to 10 percent slopes, moderately eroded. This soil occupies uplands and is deep and well drained. The hazard of erosion is severe.

The soil in this unit is suited to most of the common crops, especially truck crops. Erosion can be controlled and moisture conserved by tilling the soil as little as possible, using a rotation that includes hay or other close-growing vegetation at least three-fourths of the time, stripcropping on the contour, and constructing diversion terraces and well-sodded waterways. Because the soil is somewhat droughty, irrigation is desirable in long dry periods.

CAPABILITY UNIT IIIe-33

This unit consists of moderately sloping soils on uplands that are deep and somewhat excessively drained. These have a thick, sandy surface layer and a somewhat finer textured, moderately permeable subsoil.

The soils in this unit are especially well suited to truck crops and other early crops. They are seasonally droughty, however, and moisture must be conserved if crops are to be grown successfully. Supplemental irrigation is desirable, especially in dry periods. Nevertheless, the main concerns of management are water erosion and soil blowing. These can be controlled by using a crop rotation at least 4 years long, by farming the soils in narrow strips on the contour, and by protecting the surface with vegetation as much of the time as possible.

CAPABILITY UNIT IIIe-36

Matawan loamy sand, 5 to 10 percent slopes, is the only soil in this unit. It is a coarse-textured, moderately well drained soil on uplands. It is likely to erode severely if left unprotected.

This soil is suited to most crops grown in the county, but it does not retain plant nutrients well and must be adequately fertilized if it is to produce satisfactorily. Measures are needed that dispose of excess surface water safely in wet periods and that control washing and soil blowing.

CAPABILITY UNIT IIIw-6

This unit consists of poorly drained, moderately coarse textured, level to gently sloping soils that have a moderately permeable subsoil. In these soils the water table is at or near the surface in winter and spring, but it is commonly below a depth of 5 feet in summer and fall. The available moisture capacity is high, and the inherent fertility is moderate.

In areas where outlets are adequate, the soils in this unit can be drained. Tile drainage is suitable, but ditches that penetrate into the loose, sandy substratum are difficult to maintain because soil material tends to cave into the channels (fig. 13). Runoff from higher adjacent areas should be intercepted and safely carried away. If the soils are drained and otherwise are well managed, they are well suited to corn and soybeans and can be used for pasture and hay crops. Erosion control measures are needed in gently sloping areas.

Figure 13.—**A drainage ditch constructed in Fallsington sandy loam, capability unit IIIw-6. The ditchbanks have caved and sandy material has flowed along the bottom.**

CAPABILITY UNIT IIIw-7

This unit consists of poorly drained, medium-textured, nearly level soils on uplands. These soils have a subsoil in which permeability is moderate or moderately slow. The water table is at or near the surface in winter and spring and seldom falls to a depth of much more than 3 feet. The soils have high available moisture capacity but are fairly difficult to work if they are a little too wet or too dry.

These soils can be drained through tile lines or ditches if outlets are adequate, though drains must be spaced more closely than in soils having a coarser textured subsoil. Runoff from higher adjacent areas should be intercepted and diverted. After drainage is improved, the soils are suited to corn, soybeans, and plants grown for hay or pasture. If the soils are cover cropped in winter and otherwise are carefully managed, they can be safely kept in row crops for several consecutive years.

CAPABILITY UNIT IIIw-9

This unit consists of nearly level, poorly drained soils on uplands. These soils have a medium-textured surface layer and a fine-textured, very slowly permeable subsoil. The water table is at or near the surface in winter and sometimes late into spring. These soils are more difficult to drain than most other poorly drained soils of the county. Tile lines do not function well in the tight subsoil, and ditches must be closely spaced. Surface drainage can be

improved by grading the areas between ditches or by planting crops in elevated or graded rows. Where drained, the soils are used for corn, soybeans, and, less commonly, hay or pasture. Erosion generally is not a hazard, but any runoff from adjacent higher areas should be intercepted and diverted.

CAPABILITY UNIT IIIw-10

This unit consists of moderately well drained or somewhat poorly drained, coarse-textured, nearly level or gently sloping soils in which the material below the subsoil is loose and sandy. These soils are strongly acid, low in plant nutrients, and rapidly permeable. Although they contain excess water in wet periods, they hold little moisture available to plants in dry periods.

Improved drainage is needed if crops are grown, but ditches are difficult to maintain because these sandy soils flow when they are saturated. Tile drains are more satisfactory. The soils are suited to most crops but are used chiefly for corn and soybeans. Crops grow fairly well if the supply of plant nutrients is adequate and if irrigation water is provided in dry periods.

CAPABILITY UNIT IIIw-11

The only soil in this unit is Elkton sandy loam. This moderately coarse textured soil is nearly level and poorly drained. It has a slowly permeable subsoil.

This soil can be drained more easily by ditching than by tiling, for tile lines do not function well in the tight subsoil. After drainage is improved, the soil is suited to corn, soybeans, and most other crops commonly grown. Fertilizer and lime are needed in large amounts. Although erosion normally is not a hazard, runoff from adjacent soils should be intercepted and diverted to safe disposal areas.

CAPABILITY UNIT IIIs-1

This unit consists of deep, coarse-textured, level to strongly sloping soils that are rapidly permeable and somewhat excessively drained or excessively drained. These soils are acid, are low in plant nutrients, contain little organic matter, and have low available moisture capacity. They are highly susceptible to soil blowing and should be kept protected by a vegetative cover.

The soils in this unit are used for corn and soybeans and are especially well suited to truck crops. Large amounts of fertilizer and generally some lime are needed, but care should be taken not to overlime these sandy soils. Good management includes the use of close-growing crops in the rotation, planting crops in strips crosswise to the prevailing wind, and establishing and maintaining windbreaks. Crop residues should be kept on or near the soil surface. Annual crops benefit from irrigation, particularly in dry periods, but trees and other deep-rooted plants generally can obtain moisture in the clayey material that commonly occurs at a depth of 4 to 6 feet.

CAPABILITY UNIT IVe-5

This unit consists of strongly sloping, moderately coarse textured soils on uplands that are deep and well drained. These soils warm fairly early in spring and are easily worked, but they are very severely limited by the hazard of erosion. Their available moisture capacity is moderate to low.

If these soils are used for crops, they should be farmed in long rotations and kept covered by close-growing plants at least 4 years in every 5. An occasional tilled crop can be grown if it is planted in narrow strips on the contour. A safer use is permanent hay, permanent pasture, or contoured orchards in which the soil surface is well protected. Irrigation is desirable where it is economically feasible.

CAPABILITY UNIT IVw-6

In this unit are level, sandy soils that are poorly drained. The water table is at or near the surface for long periods each year, and excess water severely limits use of the soils for cultivation. These soils are very strongly acid and very low in plant nutrients. They can be drained by tiling or ditching, but ditches tend to cave and flow.

After drainage is improved, the soils in this unit are suited to corn, soybeans, and some kinds of truck crops and garden crops. Lime and large amounts of fertilizer are needed. Irrigation is beneficial in dry periods but is economically feasible only in fields used for crops of high value. Blueberries, though not commonly grown, are generally suited to these soils. Hay and pasture plants grow poorly.

CAPABILITY UNIT IVw-7

In this unit are very poorly drained, extremely acid Muck soils that are subject to flooding. These organic soils generally are not farmed, but they can be used for crops if they are drained and are adequately limed and fertilized. Where drainage is improved, however, the organic material shrinks and subsides as it dries, and this increases the risk of flooding. Most areas of Muck remain wooded. These areas furnish wood products and make excellent habitat for some kinds of wildlife.

CAPABILITY UNIT IVs-1

This unit consists of deep, very sandy, level to gently sloping soils that are rapidly permeable and excessively drained. These soils have low available moisture capacity and are seasonally droughty. They contain only a small supply of plant nutrients and are susceptible to washing by water and blowing by wind.

The soils in this unit can be used for corn and soybeans and are especially well suited to early truck crops. Good management includes the use of close-growing crops in the rotation, stripcropping at right angles to the prevailing wind, returning all crop residues to the soil, and establishing windbreaks. Large amounts of fertilizer are needed, and irrigation water is of benefit to crops in dry years.

CAPABILITY UNIT Vw-1

The only soil in this unit is Othello silt loam, low. This soil is poorly drained. Because it is only slightly above sea level, it is subject to occasional flooding by high tides.

This soil remains wet most of the year and is difficult to drain. It is not suited to cultivated crops but can be used for pasture, woodland, or wildlife food and cover. The soil is fairly well suited to pasture if it is seeded to adapted grasses and is limed and fertilized. Hay can be harvested from areas not used for grazing. But hay and pasture plants, and even trees, may be damaged by salt water when the soil is flooded by unusually high tides.

CAPABILITY UNIT Vw-5

This unit consists of somewhat poorly drained to very poorly drained, very acid, coarse-textured soils that have

an organic hardpan in the subsoil and a water table that is high or very high. These soils are too acid, too wet, and too low in fertility for most crops. If the soils are drained, however, they are droughty in dry periods. They are most commonly used as woodland, for unimproved pasture, and as habitat for wildlife. Locally, under special management, they can be used for blueberries and other acid-tolerant crops.

CAPABILITY UNIT VIe-2

The soils in this unit are deep, strongly sloping to steep, and well drained. These soils are not suited to cultivated crops, not even those grown in long rotations, but they can be used to a limited extent for hay crops or for sodded orchards laid out along the contour. They also can be used for improved pasture or trees. Care must be taken to protect pasture from overgrazing, which damages the sod and may expose the soil to severe erosion. Areas not needed for hay, orchards, or pastures should be used as woodland.

CAPABILITY UNIT VIw-1

Only Mixed alluvial land is in this unit. This land is on flood plains that are subject to flooding; it consists of variable soil material and is mostly poorly or very poorly drained.

Because the land generally is wet and has a high water table much of the year, it is not suited to cultivated crops. Pasture is a suitable use, but preparing an uncleared area for grazing is costly. In areas already cleared, water-tolerant grasses and legumes can be planted for pasture. Satisfactory forage is obtained if weeds are controlled and if grazing is limited to periods of the year when the land is not too wet. Areas now covered with trees should remain wooded, and some cleared areas should be planted to trees. Also, this land can be used for wildlife habitat and some kinds of recreation, and in many places it is suitable as sites for ponds or small lakes.

CAPABILITY UNIT VIw-2

The only soil in this unit is Elkton silty clay loam. This soil is nearly level and poorly drained. It cannot be used for cultivated crops, because it is too wet and is difficult to drain and to work. The surface layer is hard when dry, firm when moist, and sticky when wet, and the subsoil is so fine textured and so slowly permeable that improving drainage is impractical. Most areas of this soil are wooded or idle.

CAPABILITY UNIT VIIe-2

Matawan loamy sand, 10 to 30 percent slopes, is the only soil in this unit. This soil is deep and, in most places, well drained. It is too steep for cultivation, but it is suited to trees and can be used for pasture if grazing is carefully controlled. Overgrazing weakens the pasture plants and exposes the soil to severe erosion. In wooded areas where the existing stand is poor, adapted trees can be planted. Many cleared areas should be reforested. Other suitable uses for this soil are recreation and wildlife habitat.

CAPABILITY UNIT VIIw-1

Only Swamp is in this unit. It consists of very wet, unclassified soil material that is not used for farming, because drainage is impractical. Generally, Swamp is suitable only as wetland forest and as wildlife habitat, but a few areas furnish a little browse for livestock when the water is low. Recreation is a possible use in some areas.

CAPABILITY UNIT VIIs-1

In this unit are deep, sloping to steep soils that consist mainly of sand or loamy sand and are rapidly permeable and excessively drained. Because they are droughty and highly erodible, these soils are not suited to crops or pasture, but some areas provide limited grazing or shelter for livestock. The soils generally are not well suited to trees, though Virginia pine can be grown for pulpwood if it is properly managed, and planted loblolly pine grows fairly well. Recreation and wildlife habitat are other suitable uses.

CAPABILITY UNIT VIIIw-1

Only Tidal marsh is in this unit. It consists of marshland that is regularly flooded by salt water. This land type is not suitable for farming, but the marshes and their waterways are useful for wildlife, particularly waterfowl and muskrats.

CAPABILITY UNIT VIIIs-2

This unit consists only of Beaches. These are areas of almost bare, incoherent loose sand along bays and rivers in the county. Beaches have no value for farming but are suitable for recreation. In some places it is desirable to stabilize the areas to control shifting of sand by waves, tides, and winds.

CAPABILITY UNIT VIIIs-4

Only Borrow pits are in this unit. These areas generally serve no farm use unless they are completely reclaimed. Some individual areas, with some improvement, could be used for farm ponds.

General Management Requirements

Some of the management practices needed to obtain a good growth of crops and, at the same time, to control erosion can be conveniently summarized for all the soils in the county. Among these practices are the drainage of wet soils, irrigation of soils in dry years, use of adequate soil amendments, and proper tillage.

Drainage

Improved drainage is one of the principal management needs in Wicomico County. Only a few farms are located entirely on well-drained soils. These farms are chiefly in the central part of the county, where they generally lie close to, but higher than, the Wicomico River or other large streams.

Because of a high water table or an impervious layer, many soils in the county, including the Plummer and Rutlege, are saturated with water part of the time. Such soils are cold and wet in the early part of the growing season, but they may be so dry later in the season that crops are damaged by drought. Roots grow to a depth of only a few inches in very poorly drained soils, whereas they extend to a depth of 40 inches or more in well-drained soils. Root growth is restricted by a hardpan in such soils as the Leon and St. Johns.

Artificial drainage is needed in some degree on about 65 percent of the total acreage in the county, or about 75 percent of the acreage suitable for crops. Crops often grow poorly or may fail completely unless a drainage system

is well established, maintained, and controlled. This is especially true in the eastern part of the county and in a belt that extends from the Delaware line southwestward to Hebron, Quantico, and Nanticoke.

Of the total acreage needing drainage, a large part is made up of moderately well drained soils. Draining these soils may consist only of removing excess surface water. The kind and degree of artificial drainage needed depend on the kinds of crops grown. Poorly drained and very poorly drained soils make up the remaining acreage that needs drainage. Before these soils can be successfully used for most crops, the improvement in drainage must be intensive.

Soils that require no artificial drainage are those of the Downer, Evesboro, Galestown, Matapeake, Norfolk, and Sassafras series. These soils make up about 24 percent of the total area in the county.

Soils that require moderate artificial drainage are those of the Keyport, Klej, Matawan, Mattapex, and Woodstown series. These soils make up about 22 percent of the county.

Soils that require intensive artificial drainage are those of the Elkton, Fallsington, Leon, Othello, and Plummer series, as well as Mixed alluvial land. These soils make up about 30 percent of the county.

Soils that require very intensive artificial drainage are those of the Bayboro, Pocomoke, Portsmouth, Rutlege, and St. Johns series, as well as Muck. These soils make up about 16 percent of the county.

The rest of the county consists of miscellaneous land types that would not be suitable for farming, even if they were drained.

The kinds of drainage systems that are suitable for the soils of this county are explained in the "Drainage Guide for Maryland" (*10*).

Mixed alluvial land and Muck occur on flood plains, where the severity of the flood hazard varies from place to place. Records of flooding are the best guides to the need for protection.

Irrigation

The amount and distribution of rainfall in Wicomico County generally are adequate for crops, but there are extended dry periods when irrigation can be the means of sustaining crop growth, especially on those soils that have less capacity to hold moisture for crops (fig. 14). Information concerning irrigation is given in the "Maryland Guide for Sprinkler Irrigation," which can be obtained from the Maryland Agricultural Extension Service or the Maryland Agricultural Experiment Station. Features that affect the suitability of individual soils for irrigation are given in table 7, "Engineering Interpretations," in the subsection "Engineering Uses of Soils."

Soil amendments

The soils in this county are naturally low or very low in plant nutrients. All the soils are acid, and some are extremely acid. For these reasons, additions of lime and fertilizer are needed for most crops. The amount of lime and the kinds and amounts of fertilizer needed can be determined by soil tests. Assistance in determining the specific requirement on each soil can be obtained from the

Figure 14.—**Irrigating crops recently planted on Matawan loamy sand, 0 to 2 percent slopes. Unless water is provided through irrigation, crops on this soil are commonly damaged by drought.**

county agricultural agent, who will arrange to have soils tested at the Soil Testing Laboratory of the University of Maryland.

Lime generally is needed about once every 2 or 3 years. On very sandy soils and on well drained or moderately well drained soils, the amount of lime needed is 1 to 1½ tons per acre. On most other soils the amount needed is 2 to 3 tons per acre, but on the Bayboro, Pocomoke, Portsmouth, and other wet soils that have a high content of organic matter, the requirement per acre may be 3 to 5 tons or more.

Manure furnishes large amounts of nitrogen and organic matter and smaller amounts of other plant nutrients. In Wicomico County large quantities of poultry manure are applied to cultivated fields each year, mostly to sandy soils (fig. 15).

Tillage

On all soils in the county, tillage should be limited to that needed for the quick germination of seeds, the adequate growth of seedlings, and the maturing of a normal crop. Keeping tillage to a minimum is effective in reducing erosion and the breakdown of soil structure (fig. 16).

The continued use of heavy machinery compacts many kinds of soils and makes them difficult to work. This damage is more likely to occur on the Elkton, Othello, and other medium-textured to fine-textured soils that are poorly drained (fig. 17).

Estimated Yields

Table 2 shows the estimated average yields per acre of the principal crops grown on soils of the county under improved management. Yields are not listed for Beaches, Borrow pits, Made land, Mixed alluvial land, Swamp, and

Figure 15.—**Spreading poultry manure on Matawan loamy sand, 0 to 2 percent slopes.**

Figure 17.—**An area of Othello silt loam that was compacted by the wheels of trucks loaded with harvested tomatoes. The damage is serious because the soil was moist when the trucks were used.**

Tidal marsh, because crops and pasture are not grown on these areas.

The yields given in the table are those that are obtained under management followed by farmers who use good conservation practices. This level of management is considered high, and at this level each soil is used within its capability.

To obtain the yields listed in table 2, all or nearly all of the following practices are needed:

1. Contour tillage, stripcropping, terracing, minimum tillage, and similar practices are used to help control erosion on soils that are suitable for cultivation but susceptible to erosion; the soils that need drainage are adequately drained; excess water is disposed of safely; and irrigation water is supplied to soils and crops that need it.
2. Crop rotations are of adequate length. They generally consist of a tilled crop that helps to control weeds, a deep-rooted crop that improves soil permeability, legumes for 1 or more years to help maintain or improve fertility, and a close-growing crop or a green-manure crop. A close-growing crop or a green-manure crop helps to improve structure and tilth, supplies organic matter, and reduces erosion.
3. Manure and crop residues are turned under to supply organic matter, as well as nitrogen and other plant nutrients. This also improves tilth and aids in controlling soil losses.
4. Fertilizer and lime are applied according to needs indicated by soil tests.
5. Suitable methods of plowing, preparing the seedbed, and cultivating are used, but tillage is kept to a minimum.
6. Planting, cultivating, and harvesting are done at the right time and in the right way.
7. Weeds, diseases, and insects are controlled.
8. Crop varieties suited to the soils are selected for planting.

Figure 16.—**Lister planter preparing the soil, applying fertilizer, and planting corn in one operation. The soil is Sassafras sandy loam, 0 to 2 percent slopes.**

The yields shown in table 2 are not presumed to be the highest yields obtainable, but they set a goal that is practical for most farmers to reach if they use good management. Yields on the same soil can be expected to vary because of differences in management, in the weather, in the crop varieties grown, and in the numbers and kinds of insects, diseases, and weeds.

More information about management practices needed to obtain good yields can be found in the subsections "Capability Groups of Soils" and "General Management Requirements."

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TABLE 2.—*Estimated average yields per acre of principal crops grown under improved, or high-level, mana*

[Absence of yield figure indicates that crop is not suited to the soil or is not commonly grown on it]

Soil	Corn	Soybeans	Sweet potatoes	Tomatoes	Winter barley	Cucumbers	Alfalfa hay	Clover-grass hay	Lespede Hay
	Bu.	*Bu.*	*Bu.*	*Tons*	*Bu.*	*Bu.*	*Tons*	*Tons*	*Tons*
Bayboro loam	80	30		12				3.0	
Bayboro silt loam	80	30							
Downer loamy sand, 0 to 2 percent slopes	95	43	500	15	57	450	4.1	2.9	2.1
Downer loamy sand, 2 to 5 percent slopes, moderately eroded	95	42	425	15	55	450	4.0	2.8	2.0
Downer loamy sand, 5 to 10 percent slopes	85	40	425		54		4.0	2.7	2.0
Elkton loam	80	30		12				3.0	
Elkton sandy loam	75	30		15				3.0	
Elkton silt loam	80	30						3.0	
Elkton silty clay loam								2.0	
Evesboro loamy sand, 5 to 15 percent slopes						300		2.0	1.3
Evesboro loamy sand, clayey substratum, 0 to 5 percent slopes	90	30	450	15	50	450	2.5	2.0	1.8
Evesboro sand, 5 to 15 percent slopes								1.8	1.0
Evesboro sand, clayey substratum, 0 to 5 percent slopes	85	30	350		45	300	2.2	1.8	1.5
Evesboro soils, 15 to 40 percent slopes								1.5	.9
Evesboro-Galestown sands, 5 to 15 percent slopes								1.8	1.0
Evesboro-Galestown sands, clayey substratum, 0 to 5 percent slopes	85	30	350		45	300	2.2	1.8	1.5
Evesboro-Galestown-Downer loamy sands, 0 to 10 percent slopes	90	30	450	15	50	450	2.5	2.0	1.8
Fallsington fine sandy loam	95	35		13	45	350		3.0	1.9
Fallsington loam	95	35		13	45	300		3.0	1.9
Fallsington sandy loam	95	35		14	45	350		3.0	1.9
Galestown loamy sand, 5 to 15 percent slopes						300		2.0	1.3
Galestown loamy sand, clayey substratum, 0 to 5 percent slopes	90	30	450	15	50	450	2.5	2.0	1.8
Keyport silt loam, 0 to 2 percent slopes	95	35		15	50		3.5	3.0	2.1
Keyport silt loam, 2 to 5 percent slopes	95	40		15	52		3.5	3.0	2.2
Klej loamy sand, 0 to 2 percent slopes	90	30	425	10	48	300	3.1	2.4	1.6
Klej loamy sand, 2 to 5 percent slopes	95	30	425	10	51	300	3.4	2.6	1.7
Leon loamy sand	65	17				250		1.1	
Matapeake fine sandy loam, 0 to 2 percent slopes	115	40		20	62	350	4.5	3.5	2.3
Matapeake fine sandy loam, 2 to 5 percent slopes, moderately eroded	115	40		18	60	350	4.5	3.5	2.2
Matapeake silt loam, 0 to 2 percent slopes	115	40		18	62		4.5	3.5	2.3
Matapeake silt loam, 2 to 5 percent slopes, moderately eroded	115	40		18	60		4.5	3.5	2.2
Matapeake silt loam, 5 to 10 percent slopes	110	35			59		4.5	3.5	2.2
Matawan fine sandy loam, 0 to 2 percent slopes	105	35	425	16	54	400	3.9	2.8	2.0
Matawan fine sandy loam, 2 to 5 percent slopes	110	35	425	16	57	400	4.2	3.0	2.1
Matawan loamy sand, 0 to 2 percent slopes	100	35	500	15	51	350	3.6	2.7	1.9
Matawan loamy sand, 2 to 5 percent slopes	105	35	500	15	54	350	4.0	2.9	2.0
Matawan loamy sand, 5 to 10 percent slopes	100	35	450		51		3.8	2.8	2.0

Matawan loamy sand, 10 to 30 percent slopes									
Matawan sandy loam, 0 to 2 percent slopes	105	35	425	16	54	400	3. 9	2. 8	2. 0
Matawan sandy loam, 2 to 5 percent slopes	110	35	425	16	57	400	4. 2	3. 0	2. 1
Mattapex loam, 0 to 2 percent slopes	100	40		16	56		4. 0	3. 5	2. 2
Mattapex loam, 2 to 5 percent slopes	105	40		16	59		4. 0	3. 5	2. 3
Mattapex silt loam, 0 to 2 percent slopes	100	40		15	56		4. 0	3. 5	2. 2
Mattapex silt loam, 2 to 5 percent slopes	105	40		15	59		4. 0	3. 5	2. 3
Muck								2. 7	
Norfolk loamy sand, 0 to 2 percent slopes	95	43	500	16	57	500	4. 1	2. 9	2. 1
Norfolk loamy sand, 2 to 5 percent slopes	95	42	500	16	55	500	4. 0	2. 8	2. 0
Norfolk loamy sand, 5 to 10 percent slopes	85	40	450		54		4. 0	2. 7	2. 0
Norfolk and Sassafras soils, 10 to 15 percent slopes	80	35	425		51		3. 9	2. 6	2. 0
Norfolk and Sassafras soils, 15 to 30 percent slopes							3. 7	2. 4	1. 9
Othello silt loam	85	30		15	47			3. 0	
Othello silt loam, low								2. 0	
Plummer loamy sand	60	20		15		300		1. 6	
Pocomoke loam	90	35		15	45			3. 0	
Pocomoke sandy loam	85	30		11	45	300		2. 5	
Portsmouth sandy loam	90	35		10	47			2. 7	
Portsmouth silt loam	90	35		10	47			2. 8	
Rutlege loamy sand	70	25						2. 0	
Sassafras fine sandy loam, 0 to 2 percent slopes	110	45	450	20	60	450	4. 0	3. 0	2. 2
Sassafras fine sandy loam, 2 to 5 percent slopes	110	45	450	19	60	450	4. 0	3. 0	2. 2
Sassafras sandy loam, 0 to 2 percent slopes	105	45	450	19	60	450	4. 0	3. 0	2. 2
Sassafras sandy loam, 2 to 5 percent slopes, moderately eroded	105	45	450	15	58	450	4. 0	3. 0	2. 2
Sassafras sandy loam, 5 to 10 percent slopes, moderately eroded	95	40	425		55		4. 0	3. 0	2. 1
St. Johns loamy sand	65	19						1. 3	
St. Johns mucky loamy sand	65	19						1. 3	
Woodstown fine sandy loam, 0 to 2 percent slopes	100	40	400	14	54	400	4. 0	3. 0	2. 0
Woodstown fine sandy loam, 2 to 5 percent slopes	105	45	425	14	57	400	4. 0	3. 0	2. 1
Woodstown loam, 0 to 2 percent slopes	100	40		14	54	400	4. 0	3. 0	2. 0
Woodstown sandy loam, 0 to 2 percent slopes	100	40	425	14	54	400	4. 0	3. 0	2. 0
Woodstown sandy loam, 2 to 5 percent slopes	105	45	425	14	57	400	4. 0	3. 0	2. 1

[1] Cow-acre-days is a term used to express the carrying capacity of pasture. It is the number of animal units carried per acre multipli the pasture is grazed during a single grazing season without injury to the sod. For example, an acre of pasture that provides 30 days of g carrying capacity of 60 cow-acre-days.

Use of Soils as Woodland[2]

Woodland occupies about 47 percent of Wicomico County, or 113,400 acres. Trees harvested from wooded areas are used for lumber and timber, poles and piling, veneer for furniture and baskets, and pulpwood. Some owners cut fenceposts and fuelwood for domestic use. In 1966, a plant was built at Pocomoke City for manufacturing plywood and processing logs into chips for paper.

The stands consist mainly of hardwoods and pines, including two of the most valuable species in the State, loblolly pine and sweetgum. Oaks, yellow-poplar, sweetgum, maple, and other hardwoods cover 42 percent of the wooded acreage and occur on uplands and bottom lands throughout the county. Loblolly pine occurs in much of the county, but it does not grow on the ridges of very droughty sand along the Nanticoke River, in low areas that are flooded part of the year, and in areas of Tidal marsh. Shortleaf pine and Virginia pine are present in some areas on the excessively drained sandy bluffs. Green ash, red maple, baldcypress, and blackgum are among the trees growing on bottom lands that are flooded part of the year.

All the woodland in the county is second growth. Because of overcutting and poor management, the stands on about half the acreage are less than fully stocked and do not contain the best species. Woodland should be managed so that loblolly pine and sweetgum grow in fully stocked stands that are well suited to each soil.

At least 90 percent of the land area of Wicomico County can produce loblolly pine commercially, and more than 50 percent can be highly productive of that valuable tree. This potential is an important factor in planning for long-term use, particularly of the wet lands that need artificial drainage.

Woodland suitability groups

Just as soils are placed in capability classes, subclasses, and units according to their suitability for crops and pasture, they can be grouped according to their suitability for trees. Each woodland suitability group is made up of soils that are suitable for about the same kinds of trees, require similar practices for conserving soil and moisture, and have similar potential productivity for wood crops.

The potential productivity of a soil for trees is expressed as the site index, which is the average height, in feet, that a specified kind of tree, growing on that soil, will reach in 50 years. For the soils of Wicomico County, site indexes have been determined only for loblolly pine. These indexes are based on studies made in Maryland and nearby States.

All the soils in one woodland suitability group have about the same site index and are suitable for the same kinds of trees. Also, they are similar with respect to the hazards and limitations that affect management: plant competition, limitations of the use of equipment, seedling mortality, and the hazards of windthrow and erosion. The hazards and limitations are rated as *slight*, *moderate*, or *severe*.

Plant competition is the invasion or growth of undesirable species when openings are made in the canopy. The ratings are based on the degree that unwanted plants compete with loblolly pine and hardwoods. Limitations on the use of equipment vary according to slope and characteristics of the soils that restrict or prohibit the use of equipment commonly employed in tending and harvesting trees. Seedling mortality refers to the expected loss of naturally occurring or planted seedlings as influenced by kinds of soil. The ratings for hazard of windthrow are based on soil characteristics that influence the development of tree roots. The hazard of erosion refers to erodibility when the soils are not fully protected by a woodland cover, as during the seedling stage of tree growth after clear harvesting.

In the following discussion, the woodland groups are not numbered consecutively, because they are part of a system of grouping that is used throughout Maryland, and only a comparatively few of all the groups are represented in this county. To find the names of the soils in any given woodland group, refer to the "Guide to Mapping Units" at the back of this soil survey.

WOODLAND SUITABILITY GROUP 1

This group consists of poorly drained and very poorly drained soils on uplands. The surface layer of these soils ranges from sandy loam to loam or silt loam, and the subsoil ranges from sandy clay loam to silty clay. Some areas are in depressions that may be ponded during wet periods unless surface drainage is improved.

This is the most extensive woodland group in the county. The soils occupy 74,927 acres, or 30.8 percent of the total area.

The site index for loblolly pine is generally well above 85 and, on especially good sites, may be 95 or more.

Loblolly pine should have first priority on the soils of this group (fig. 18). Valuable oaks and sweetgum trees that may be growing should be well managed until they are ready for harvesting. Then, they can be replaced by loblolly pine. Yellow-poplar should be encouraged in areas where surface drainage is adequate.

Plant competition is severe for conifers and is moderate for hardwoods. Limitations on the use of equipment are severe because the soils are wet for a long period each year. Seedling mortality and the hazards of windthrow and erosion are only slight.

At a site index of 85, the expected yield per acre from well-stocked, unmanaged stands of 50-year-old loblolly pine is about 14,000 board feet of merchantable timber or 65 cords of pulpwood. For the next 10 to 20 years, the expected annual increase in yield per acre is about 500 board feet of timber or about one-half cord of pulpwood.

Scotch pine is suitable for Christmas trees. Austrian pine also does well.

WOODLAND SUITABILITY GROUP 2

Only Mixed alluvial land is in this group. It occurs on flood plains of the county and may be flooded one or more times each year. Floodwater seldom remains for long periods, however, and ponding is unlikely.

This land type occupies 4,483 acres, or about 1.8 percent of the county.

Although little is known about the productivity of this land for trees, the site index for loblolly pine is estimated to be 85 or slightly more.

This land is well suited to hardwoods. Sweetgum and oaks that are valuable for timber should have priority over loblolly pine. Yellow-poplar should be encouraged

[2] C. L. SEWELL, district forester, Maryland Department of Forests and Parks, helped to prepare this subsection.

Figure 18.—**Harvesting loblolly pine in a stand on Pocomoke sandy loam. This soil is in woodland suitability group 1.**

on hummocks, on natural levees along streams, and in other areas where surface drainage is good.

Competition from undesirable plants is only slight, but fers; hardwoods tend to eliminate pine. The use of equipment is severely limited because of wetness and possible flooding. Seedling mortality is moderate. Windthrow is only a slight hazard, and there is little or no risk of erosion except at times when floodwater may cause some scouring. In addition, flooding streams may deposit soil material in some places.

At a site index of 85, the expected yield per acre from well-stocked, unmanaged stands of 50-year-old loblolly pine is about 14,000 board feet of merchantable timber or about 65 cords of pulpwood. For the next 10 to 20 years, the expected annual increase in yield per acre is about 500 board feet of timber or about one-half cord of pulpwood.

Scotch pine is probably the most suitable species for production of Christmas trees on these soils.

WOODLAND SUITABILITY GROUP 3

This group consists of moderately well drained or somewhat poorly drained soils in which the material below the surface layer ranges from loose loamy sand to firm sandy clay loam or clay loam. Permeability in this material is moderately slow to rapid.

The soils of this group occupy 50,180 acres, or about 20.6 percent of the county.

The average site index for loblolly pine is slightly above 85.

Loblolly pine is of first priority on these soils. Other well-suited trees are the desirable oaks, sweetgum, yellow-poplar, and other hardwoods.

Competition from unwanted plants is severe for conifers, but in most places seedling mortality is only slight. Limitations on the use of equipment are moderate because the surface layer tends to be wet and the water table is high in winter and early in spring. The hazards of windthrow and erosion are only slight.

At a site index of 85, the expected yield per acre from well-stocked, unmanaged stands of 50-year-old loblolly pine is about 14,000 board feet of merchantable timber or about 65 cords of pulpwood. For the next 10 to 20 years, the expected annual increase in yield per acre is about 500 board feet of timber or about one-half cord of pulpwood.

Suitable for Christmas trees are Scotch pine, Norway spruce, Austrian pine, and white pine.

WOODLAND SUITABILITY GROUP 5

This group is made up of deep, nearly level to strongly sloping sands and loamy sands that are somewhat excessively drained or excessively drained. These soils are rapidly permeable throughout, but some of them have a moisture-retaining clayey layer at a depth of 4 to 6 feet.

The soils in this group occupy 29,753 acres, or about 12.2 percent of the county.

The site index for loblolly pine ranges from 75 to 84, and the average site index for this species is about 80.

These soils are not well suited to most hardwoods. Although loblolly pine is the favored tree, shortleaf and Virginia pines also do well and should be managed in existing stands until they are ready for harvesting. Then, loblolly pine can be planted.

Competition from undesirable plants is only slight, but seedling mortality is moderate because the soils are so sandy. The use of equipment is moderately limited by sandiness and, in some areas, by slope. The hazards of windthrow and water erosion are only slight, though clean-tilled areas that have been recently planted to pine are susceptible to soil blowing until the tree seedlings are established.

At a site index of 80, the expected yield per acre from well-stocked, unmanaged stands of 50-year-old loblolly pine is about 11,500 board feet of merchantable timber or about 60 cords of pulpwood. For the next 10 to 20 years, the expected annual increase in yield per acre is about 400 board feet of timber or about one-half cord of pulpwood.

Scotch pine is suitable for Christmas trees.

WOODLAND SUITABILITY GROUP 6

The only mapping unit in this group is Evesboro soils, 15 to 40 percent slopes. These soils are sandy and are somewhat excessively drained or excessively drained. They have a total area of only 230 acres, or less than 0.1 percent of the county.

The site index for loblolly pine ranges from 75 to 84, but the average site index is close to 75.

Loblolly pine is the preferred species on these soils. Good stands of shortleaf and Virginia pines should be well managed until the trees are ready for harvesting. Then, they can be replaced by loblolly pine.

For conifers there is moderate competition from unwanted plants, mostly scrub hardwoods. Because the soils are sandy and strongly sloping to steep, the use of equipment is severely limited. Generally, seedling mortality is moderate. Soil blowing and water erosion are moderate hazards. The risk of windthrow is only slight.

At a site index of 75, the expected yield per acre from well-stocked, unmanaged stands of 50-year-old loblolly pine is about 9,000 board feet of merchantable timber or about 55 cords of pulpwood. For the next 10 to 20 years, the expected annual increase in yield per acre is about 350 board feet of timber or nearly one-half cord of pulpwood.

Scotch pine is suitable for Christmas trees.

WOODLAND SUITABILITY GROUP 7

This group consists of deep, well-drained, nearly level or gently sloping soils that have a subsoil of friable or firm heavy sandy loam to silty clay loam. Some areas are moderately eroded.

The soils in this group occupy 27,716 acres, or about 11.4 percent of the county.

For loblolly pine the site index ranges from 75 to 84 and, on the average, is 80 or more.

Loblolly pine is of first priority on these soils, but upland hardwoods grow well, especially on the soils having a silt loam surface layer. Good stands of desirable oaks, yellow-poplar, and other hardwoods suitable for timber should be managed until they are ready for harvesting. Then, they can be replaced by loblolly pine. Shortleaf pine also does well on these soils.

Plant competition is moderate for conifers but only slight for hardwoods. Seedling mortality, equipment limitations, and the hazards of windthrow and erosion are slight.

At a site index of 80, the expected yield per acre from well-stocked, unmanaged stands of 50-year-old loblolly pine is about 11,500 board feet of merchantable timber or about 60 cords of pulpwood. For the next 10 to 20 years, the expected annual increase in yield per acre is about 400 board feet of timber or about one-half cord of pulpwood.

Among the species suitable for Christmas trees are Scotch pine, Norway spruce, Austrian pine, and white pine.

WOODLAND SUITABILITY GROUP 8

The soils in this group are deep, well drained, and sloping or strongly sloping. They have a subsoil of friable or firm heavy sandy loam to silty clay loam. Some areas are moderately eroded.

These soils occupy 1,541 acres, or about 0.6 percent of the county. Approximately half of the total acreage is now wooded.

The site index for loblolly pine ranges from 75 to 84. On the average, the site index for this pine is 80 or higher.

Loblolly pine is the favored species, but upland hardwoods do well. Good stands of valuable oaks, yellow-poplar, and other hardwoods suitable for timber should be managed and then replaced by loblolly pine after the mature trees are harvested.

Plant competition is moderate for conifers but only slight for hardwoods. Seedling mortality, limitations on the use of equipment, and the hazard of windthrow are slight. Erosion is a moderate or severe hazard, however, in areas that are heavily cut over, are being prepared for planting, or are newly planted to seedlings.

At a site index of 80, the expected yield per acre from well-stocked, unmanaged stands of 50-year-old loblolly pine is about 11,500 board feet of merchantable timber or about 60 cords of pulpwood. For the next 10 to 20 years, the expected annual increase in yield per acre is about 400 board feet of timber or about one-half cord of pulpwood.

Scotch pine, Norway spruce, Austrian pine, and white pine are suitable for Christmas trees.

WOODLAND SUITABILITY GROUP 9

Some soils in this group are strongly sloping to steep and moderately well drained. Others are steep, are well drained, and have a subsoil of friable or firm heavy sandy loam to clay.

The soils in this group occupy only 518 acres, or about 0.2 percent of the county. Because they have severe limitations that restrict their use for crops, they are important soils for woodland. Most of the acreage is wooded.

The site index for loblolly pine is above 75 and, on the better sites, may be as high as 84.

Plant competition is moderate for conifers, but seedling mortality is only slight. Limitations on the use of heavy equipment are moderate on slopes of 15 percent or less and are severe on slopes of more than 15 percent. The hazard of erosion is severe. Windthrow is a moderate hazard, especially on the moderately well drained soils of the group.

At a site index of 80, the expected yield per acre from well-stocked, unmanaged stands of 50-year-old loblolly pine is about 11,500 board feet of merchantable timber or about 60 cords of pulpwood. For the next 10 to 20 years, the expected annual increase in yield per acre is about 400 board feet of timber or about one-half cord of pulpwood.

Species suitable for Christmas trees are Scotch pine, Norway spruce, and Austrian pine.

WOODLAND SUITABILITY GROUP 10

This group consists of sandy to clayey soils that are poorly drained or very poorly drained. Where these soils occur in depressions that have no outlet, they may be temporarily ponded in wet periods.

The soils in this group occupy 29,255 acres, or about 12 percent of the county.

The site index ranges from 75 to 84 for loblolly pine. This species should be the first choice for wood crops, but sweetgum and some water-tolerant oaks produce merchantable products on these soils, and yellow-poplar should be encouraged in areas where surface drainage is adequate.

Plant competition is moderate for conifers, but seedling mortality is only slight. The use of equipment is severely limited by wetness. The hazards of erosion and windthrow are slight.

At a site index of 80, the expected yield per acre from well-stocked, unmanaged stands of 50-year-old loblolly pine is about 11,500 board feet of merchantable timber or about 60 cords of pulpwood. For the next 10 to 20 years, the expected annual increase in yield per acre is about 400 board feet of timber or about one-half cord of pulpwood.

Scotch pine is suitable for Christmas trees. In addition, white pine and Austrian pine generally do well.

WOODLAND SUITABILITY GROUP 11

This group consists of level to gently sloping, moderately well drained soils that have a silty clay loam to silty clay subsoil. These soils are seasonally wet, commonly in winter and early in spring.

The soils in this group occupy 3,361 acres, or 1.4 percent of the county.

The site index for loblolly pine is between 75 and 84, but hardwoods should have first priority on these soils. Yellow-poplar, sweetgum, and many kinds of oaks grow well and are not subject to the severe competition from undesirable plants that delays or prevents the growth of planted pines. However, loblolly pine commonly invades abandoned or idle areas, and it is suitable for planting

if unwanted hardwoods, shrubs, and vines are controlled until the pine seedlings are well established.

The use of equipment on these soils is moderately limited by seasonal wetness. Seedling mortality is only slight, however, and there is little or no hazard of erosion. Windthrow is a moderate hazard because most of the tree roots are shallow.

At a site index of 80, the expected yield per acre from well-stocked, unmanaged stands of 50-year-old loblolly pine is about 11,500 board feet of merchantable timber or about 60 cords of pulpwood. For the next 10 to 20 years, the expected annual increase in yield per acre is about 400 board feet of timber or about one-half cord of pulpwood.

Scotch pine is suitable for Christmas trees, and Norway spruce and Austrian pine grow fairly well.

WOODLAND SUITABILITY GROUP 19

The only soil in this group is Othello silt loam, low. This soil is poorly drained and has a slowly permeable subsoil. It occupies low positions and occasionally is flooded by salt water. Trees may be affected by salt spray when the wind is strong.

This soil occupies 551 acres, or slightly more than 0.2 percent of the county.

The average site index for loblolly pine is less than 65. This pine grows slowly, but it is the only forest tree native to the county that can tolerate much salt. In many areas there is little or no vegetation except pine trees, and competition from undesirable plants is only slight. The use of equipment is severely limited, however, especially in wet periods or after the soil is flooded. Seedling mortality is severe, but the hazards of windthrow and erosion are slight.

WOODLAND SUITABILITY GROUP 20

Only Beaches is in this group. The areas consist of loose, extremely droughty sand that is not suitable for farming. In most places there are no trees, but pines have invaded some areas.

This land type occupies only 199 acres, or less than 0.1 percent of the county.

On these beaches the site index for loblolly pine generally is only 40 to 50 and the growth of trees is so slow that woodland products cannot be produced economically. Nevertheless, fairly good stands of loblolly, shortleaf, or Japanese black pine occur in some places. Even though trees grow slowly, bare areas are best planted to loblolly pine.

Competition from other plants is only slight. Limitations on the use of equipment are severe, for traction is poor and sand damages moving parts of machinery. Sand blowing is a severe hazard, but the risk of windthrow is only slight except during storms of hurricane intensity. Seedling mortality may be severe because the young trees are cut by windblown sand, are fully exposed to the hot sun and beating rain, and are washed or flooded by salt water.

This land type is not suitable for producing Christmas trees commercially.

WOODLAND SUITABILITY GROUP 21

This group consists of miscellaneous land types that occupy a total area of 20,837 acres, or about 8.7 percent of the county. These land types are not suited to trees or are too wet for woodland management.

Yields of loblolly pine

Table 3 lists data on growth and yield of second-growth loblolly pine in unmanaged, fully stocked stands. As shown in the table, a stand of unmanaged, fully stocked, second-growth loblolly pine that is 40 years old and has a site index of 70, will yield about 42 cords of wood or about 3,500 board feet of lumber per acre. If the stand is 80 years old and is on a soil having the same site index of 70, the yield is about 62 cords of wood or 15,000 board feet of lumber per acre. Interpolations can be made for site indexes and for ages of trees between the site indexes and ages listed in table 3.

Wildlife

Wildlife is a valuable resource in Wicomico County. More than 70 percent of the land area is potentially good or excellent as habitat for open-land wildlife and for woodland wildlife. Open-land wildlife includes rabbit, some deer, and quail and other upland game birds. Examples of woodland wildlife are deer, squirrel, and turkey. Only about 2.7 percent of the county is potentially good as habitat for wetland wildlife, including raccoon, woodcock, muskrat, and waterfowl.

TABLE 3.—*Growth and yield data for fully stocked, unmanaged stands of second-growth loblolly pine*

Site index	Age	Total merchantable volume per acre		Average diameter at breast height
	Years	*Cords*	*Board feet (Doyle)*	*Inches*
70	20	17	------	5.4
	30	31	1,000	7.8
	40	42	3,500	9.6
	50	50	6,500	10.9
	60	55	10,000	12.1
	70	59	12,500	13.0
	80	62	15,000	13.8
80	20	22	------	6.2
	30	38	2,000	8.7
	40	51	6,000	10.7
	50	60	11,500	12.2
	60	66	16,000	13.6
	70	70	19,500	14.6
	80	73	22,000	15.5
90	20	27	------	6.9
	30	46	4,000	9.6
	40	61	10,000	11.7
	50	71	16,500	13.6
	60	78	22,000	15.0
	70	82	26,000	16.2
	80	85	29,000	17.2
100	20	32	500	7.4
	30	53	6,000	10.4
	40	71	14,500	12.8
	50	84	23,000	14.7
	60	92	29,500	16.2
	70	96	33,000	17.6
	80	100	35,500	18.6

In addition to its land area, the county has about 102 miles of shoreline along rivers that is important to wildlife. These shores include the mud flats along the Nanticoke River. The shoreline is generally narrow but continuous; it consists of areas between normal high tide and normal low tide. When the tide is low, the shores are important as feeding grounds for some kinds of waterfowl and shore birds and for some mammals, especially raccoons. Any kind of pollution, such as that caused by insecticides and herbicides, damages these feeding grounds. Damage also is caused by shore erosion and by deposition of soil material washed from the uplands. However, material washed from uplands and marshes supplies food for many kinds of aquatic life.

Table 4 lists the soils of the county and rates their suitability for eight elements of wildlife habitat and for three classes, or kinds, of wildlife. In that table the soils are given a rating of *good*, or above average; *fair*, or average; *poor*, or below average; or *not suited.*

ELEMENTS OF WILDLIFE HABITAT.—The elements of wildlife habitat are discussed in the following paragraphs.

Grain and seed crops include corn, soybeans, sorghum, millet, wheat, buckwheat, cowpeas, oats, barley, rye, and other crops that produce grain or grainlike seeds used by wildlife.

Grasses and legumes include lespedeza, alfalfa, alsike clover, Ladino clover, red clover, tall fescue, bromegrass, bluegrass, and timothy. All of these are commonly planted for forage but also are valuable for wildlife.

Wild herbaceous upland plants consist of native annuals or other herbaceous plants that commonly grow in upland areas. Included are panicgrass and other native grasses, partridgepea, beggartick, lespedeza, and other native herbs that wildlife use for food and cover.

Hardwood woody plants are trees, shrubs, and woody vines that grow vigorously and produce heavy crops of seeds or other fruits. They are established naturally or are planted. Among these plants are dogwood, sumac, sassafras, persimmon, hazelnut, multiflora rose, perennial lespedeza, wild cherry, autumn-olive, Tartarian honeysuckle (fig. 19), various kinds of oak and hickory, blueberry, bayberry, huckleberry, blackhaw, sweetgum, and holly.

Coniferous woody plants are coniferous trees and shrubs that are native or are planted. Examples are Virginia pine, loblolly pine, shortleaf pine, pond pine, and redcedar. The rating is based on whether young plants grow rapidly and develop dense foliage, not on the size of mature plants. A soil that is good for growing Christmas trees rates high.

Wetland food and cover plants are plants that provide food and cover for waterfowl and furbearing animals. They include wildrice, smartweed, bulrush, switchgrass, wild millet, pondweed, arrow-arum, pickerelweed, cattail, waterwillow, and various sedges.

Shallow water developments are impoundments in which shallow water can be maintained at a desired level. On soils suitable for these impoundments, the water can be controlled at a level ranging from the natural water table to within 2 feet above it.

Excavated ponds are dug-out ponds that depend on ground water, not runoff. The level of water in the ponds normally fluctuates with the level of ground water. Migrating waterfowl may be especially attracted to such ponds.

***Figure 19.*—Tartarian honeysuckle growing in a hedge on Norfolk loamy sand, 0 to 2 percent slopes, north of Salisbury. This shrub provides food and shelter for many kinds of wildlife.**

Farm ponds of the impounded type are not included in table 4, but they can be important in producing fish. If fish are to be produced, at least one-fifth of the pond should be 6 feet deep or more. Table 7 in the subsection "Engineering Uses of Soils" gives features of each soil in the county that affect the selection of sites for ponds.

SUITABILITY OF SOILS FOR KINDS OF WILDLIFE.—In table 4 the soils are rated according to their suitability for three kinds of wildlife in the county. The ratings are based on the suitability of the soils for the habitat elements essential to the birds and mammals that make up each kind of wildlife.

MANAGING TIDAL MARSH FOR WILDLIFE.—Tidal marsh occupies 14,180 acres in Wicomico County and provides resting areas for many waterfowl. Because the estuaries draining these areas are relatively high in salinity, the marshland is covered with plants that are tolerant of salt. In low areas, where the water table is at the surface, the vegetation is a solid stand of needlerush and marshhay cordgrass (*Spartina patens*). In areas where the elevation is slightly greater or the water table is lower, the plant cover includes bigleaf swampweed and smooth cordgrass. The edges of Tidal marsh are commonly covered by switchgrass growing in dense stands.

Black duck, mallard, and teal are the principal kinds of waterfowl in this habitat. The plants produce little food for these birds, and only part of the existing food is accessible. Creating areas of open water through diking or blasting results in greater use of the marshland by waterfowl, both in winter and during the nesting season. Stabilizing the water level improves the habitat for muskrat.

In the management of marshland, it is important that the areas be kept free of pollution. The more salty areas can be freshened by digging small holes or ponds, each a few feet in diameter, and connecting them by ditches that contain small water-control structures. Rainwater collected in the ponds is spread through the ditches to other parts of the marshes. Spreading fresh water in this

way helps to maintain the desirable plants and consequently brings about increased use of the marshland by waterfowl and muskrat.

Some areas of marsh should not be drained, because they are made up of material called cat clay. This material, which must be identified on the site, contains large amounts of sulfur compounds. If the excess water is removed, oxidation of these compounds results in the formation of sulfuric acid that kills vegetation and makes the affected areas practically worthless.

Engineering Uses of Soils [8]

This subsection of the survey is a guide to the properties of the soils and to the influence of those properties on problems related to engineering. In part, the information was obtained by examining the soils in the field and by evaluating their characteristics with reference to engineering needs. Chiefly, however, the subsection is based on facts obtained by testing soil samples taken at 34 locations in the county. Use also was made of surveys and analyses made in Somerset and Caroline Counties, Md., and elsewhere.

With the use of the soil map for identification, the engineering interpretations in this subsection can be useful for many purposes. It should be emphasized that they may not eliminate the need for sampling and testing at the site of specific engineering works involving heavy loads and where the excavations are deeper than the depths of layers here reported. Even in these situations, the soil map is useful for planning more detailed field investigations and for suggesting the kinds of problems that may be expected. For example, the information in this subsection shows that Bayboro silt loam is not suitable for road fill or as a source of sand or gravel. It also shows that the Sassafras soils are suitable for use in constructing dikes, levees, and embankments. It does not show, however, just how good the Sassafras soils are for dikes, levees, or embankments in any particular area of these soils. Tests at the site will be required to obtain that information.

This survey contains information that can be used by engineers to—

1. Make soil and land use studies that will aid in selecting and developing industrial, business, residential, recreational, and other sites.
2. Make preliminary estimates of the engineering properties of soils in planning drainage and irrigation systems, diversion terraces, farm ponds and reservoirs, and structures for soil and water conservation or for other purposes.
3. Make preliminary evaluations of soil and ground conditions that will aid in selecting locations for highways, airports, pipelines, and cables and in planning detailed investigations at the selected locations.
4. Locate probable sources of sand and gravel for use in construction.
5. Correlate performance of engineering structures with kinds of soil and thus develop information that will be useful in designing and maintaining engineering structures and installations.
6. Determine the suitability of soils for cross-country movement of vehicles and construction equipment.
7. Supplement information obtained from other sources that can be readily used by engineers.
8. Develop other preliminary estimates for design and construction purposes pertinent to a particular area.

Much of the information in this subsection is in tables 5, 6, and 7. Table 5 lists engineering data that were obtained when selected soils in the county were tested. In table 6 are estimated engineering properties of all the soils in the county, and in table 7 are engineering interpretations of the soils.

Some of the terms used by soil scientists may be unfamiliar to engineers, and some words have a special meaning in soil science. Many of these terms are defined in the Glossary at the back of this publication.

Engineering test data

Samples that represent 12 soil series were taken from 34 locations in Wicomico County and were tested by the Bureau of Public Roads (BPR) according to standard procedures of the American Association of State Highway Officials (AASHO) (*1*). The data obtained from these tests are given in table 5.

Table 5 also gives two systems of engineering classification for each soil sample—the AASHO system and the Unified system (*12*). These classifications are based on data obtained by mechanical analyses and by tests made to determine the liquid limit and the plastic limit.

The tests for the liquid limit and plastic limit measure the effect of water on the consistence of the soil material. As the moisture content of a clayey soil increases from a very dry state, the material changes from a semisolid to a plastic state. As the moisture content is further increased, the material changes from a plastic to a liquid state. The plastic limit is the moisture content at which the material passes from a semisolid to a plastic state. The liquid limit is the moisture content at which a soil passes from a plastic to a liquid state. The plasticity index is the numerical difference between the liquid limit and the plastic limit. It indicates the range of moisture content within which a soil material is in a plastic condition. Some silty and sandy soils are nonplastic; that is, they do not become plastic at any moisture content.

Estimated engineering properties of the soils

Table 6 shows some estimated soil properties that are important in engineering, and it gives estimated AASHO and Unified classifications for the soils. The textural terms used to describe the soil material in the main horizons are those used by the U.S. Department of Agriculture. Color has been omitted from the table, but it is given in the section "Descriptions of the Soils." Also omitted is depth to bedrock, because all the soils in Wicomico County are underlain by unconsolidated sediments that extend to a great depth.

The information given in table 6 applies to soils that are only slightly eroded. Also, the thickness of the soil horizons varies somewhat from place to place, but the thickness and other properties described in the table are those that actually exist in a specific profile of the soil described; they are not averages obtained from a number of profiles.

[8] KENDALL P. JARVIS, conservation engineer, assisted in preparing this subsection.

TABLE 4.—*Suitability of soils for elements of*

Soil series and map symbol	Elements of wildlife habitat			
	Grain and seed crops	Grasses and legumes	Wild herbaceous upland plants	Hardwood woody plants
Bayboro: Ba, Bb	Not suited	Poor	Poor	Good
Beaches: Be	Not suited	Not suited	Not suited	Not suited
Borrow pits: Bo	[1]	[1]	[1]	[1]
Downer: DoA, DoB2, DoC	Fair	Fair	Fair	Fair
Elkton:				
Ea, Ek, Em	Poor	Fair	Fair	Good
En	Not suited	Poor	Poor	Good
Evesboro:				
EpB, EsB	Poor	Poor	Poor	Poor
EoD	Not suited	Poor	Poor	Poor
ErD, EtF	Not suited	Not suited	Poor	Poor
Evesboro-Galestown:				
EvD	Not suited	Not suited	Poor	Poor
EwB	Poor	Poor	Poor	Poor
Evesboro-Galestown-Downer: EyC	Poor	Poor	Poor	Poor
Fallsington: Fa, Fg, Fs	Poor	Fair	Fair	Good
Galestown:				
GaD	Not suited	Not suited	Poor	Poor
GcB	Poor	Poor	Poor	Poor
Keyport:				
KeA	Fair	Good	Good	Good
KeB	Poor	Good	Good	Good
Klej:				
KsA	Fair	Good	Good	Fair
KsB	Fair	Good	Good	Fair
Leon: Le	Not suited	Poor	Fair	Good
Made land: Ma	[1]	[1]	[1]	[1]
Matapeake:				
MdA, MeA	Good	Good	Good	Good
MdB2, MeB2, MeC	Fair	Good	Good	Good
Matawan:				
MfA, MnA	Fair	Good	Good	Good
MfB, MmB, MmC, MnB	Fair	Good	Good	Good
MmA	Fair	Good	Good	Fair
MmE	Not suited	Poor	Fair	Fair
Mattapex:				
MpA, MtA	Fair	Good	Good	Good
MpB, MtB	Fair	Good	Good	Good
Mixed alluvial land: Mv	Not suited	Poor	Poor	Good
Muck: Mu	Not suited	Poor	Not suited	Good
Norfolk: NoA, NoB, NoC	Fair	Fair	Fair	Fair
Norfolk and Sassafras:				
NsD	Poor	Poor	Fair	Fair
NsE	Not suited	Poor	Fair	Fair
Othello:				
Ot	Poor	Fair	Fair	Good
Ow	Not suited	Poor	Poor	Not suited

See footnote at end of table.

wildlife habitat and kinds of wildlife

Elements of wildlife habitat—Continued				Kinds of wildlife		
Coniferous woody plants	Wetland food and cover plants	Shallow water developments	Excavated ponds	Open-land wildlife	Woodland wildlife	Wetland wildlife
Good	Good	Good	Good	Poor	Good	Good.
Not suited	Not suited	Not suited	Not suited	Not suited	Not suited	Not suited.
[1]	[1]	[1]	[1]	[1]	[1]	[1].
Poor	Not suited	Not suited	Not suited	Fair	Fair	Not suited.
Fair	Good	Good	Good	Fair	Good	Good.
Good	Good	Good	Good	Poor	Good	Good.
Good	Not suited	Not suited	Not suited	Poor	Poor	Not suited.
Good	Not suited	Not suited	Not suited	Not suited	Poor	Not suited.
Good	Not suited	Not suited	Not suited	Not suited	Poor	Not suited.
Good	Not suited	Not suited	Not suited	Not suited	Poor	Not suited.
Good	Not suited	Not suited	Not suited	Poor	Poor	Not suited.
Good	Not suited	Not suited	Not suited	Poor	Poor	Not suited.
Fair	Good	Good	Good	Fair	Good	Good.
Fair	Not suited	Not suited	Not suited	Not suited	Poor	Not suited.
Good	Not suited	Not suited	Not suited	Poor	Poor	Not suited.
Poor	Poor	Poor	Poor	Good	Good	Poor.
Poor	Not suited	Not suited	Not suited	Fair	Good	Not suited.
Poor	Poor	Poor	Poor	Good	Fair	Poor.
Poor	Not suited	Not suited	Not suited	Good	Fair	Not suited.
Fair	Good	Poor	Poor	Poor	Good	Poor.
[1]	[1]	[1]	[1]	[1]	[1]	[1].
Poor	Not suited	Not suited	Not suited	Good	Good	Not suited.
Poor	Not suited	Not suited	Not suited	Good	Good	Not suited.
Poor	Poor	Poor	Poor	Good	Good	Poor.
Poor	Not suited	Not suited	Not suited	Good	Good	Not suited.
Poor	Poor	Poor	Poor	Good	Fair	Poor.
Poor	Not suited	Not suited	Not suited	Poor	Fair	Not suited.
Poor	Poor	Poor	Poor	Good	Good	Poor.
Poor	Not suited	Not suited	Not suited	Good	Good	Not suited.
Good	Good	Not suited	Not suited	Not suited	Good	Poor.
Not suited	Good	Good	Good	Not suited	Poor	Good.
Poor	Not suited	Not suited	Not suited	Fair	Fair	Not suited.
Poor	Not suited	Not suited	Not suited	Poor	Fair	Not suited.
Poor	Not suited	Not suited	Not suited	Poor	Fair	Not suited.
Fair	Good	Good	Good	Fair	Good	Good.
Not suited	Good	Good	Not suited	Not suited	Not suited	Good.

TABLE 4.—*Suitability of soils for elements of*

Soil series and map symbol	Elements of wildlife habitat			
	Grain and seed crops	Grasses and legumes	Wild herbaceous upland plants	Hardwood woody plants
Plummer: Pe	Poor	Poor	Fair	Fair
Pocomoke: Pk, Po	Not suited	Poor	Poor	Good
Portsmouth: Pr, Pt	Not suited	Poor	Poor	Good
Rutlege: Ru	Poor	Fair	Fair	Good
Sassafras:				
SaA, SsA	Good	Good	Good	Good
SaB, SsB2, SsC2	Fair	Good	Good	Good
St. Johns: St, Su	Not suited	Poor	Fair	Good
Swamp: Sw	Not suited	Poor	Not suited	Good
Tidal marsh: Tm	Not suited	Not suited	Not suited	Not suited
Woodstown:				
WfA, WoA, WsA	Fair	Good	Good	Good
WfB, WsB	Fair	Good	Good	Good

[1] Variable.

TABLE 5.—*Engineering test data for*

[Tests performed by the Bureau of Public Roads (BPR) in accordance with standard

Soil series and location	BPR report number	Depth	Mechanical analyses [1] Percentage passing sieve— ¾-in.	No. 4 (4.7 mm.)
		Inches		
Bayboro:				
1 mile west of Shavox, southeast of intersection of dirt road and Shavox Road. (Modal profile)	S-45588	0–7		
	S-45589	16–28		
	S-45590	38–55		
Elkton:				
4.5 miles southeast of Salisbury, 1.7 miles north of Worcester County line on northeast side of Colbourne Mill Road. (Modal profile)	S-45594	0–7		
	S-45595	13–24		
	S-45596	31–60		
3.5 miles southeast of Salisbury, 0.1 mile west of Dykes Road on north side of State Route 12. (Thin solum profile)	S-45591	3–10		
	S-45592	19–36		
	S-45593	36–56		
3.1 miles southeast of Salisbury, 0.4 mile west of Dykes Road on south side of State Route 12. (Finer textured than modal)	S-45597	1–5		
	S-45598	20–42		
	S-45599	42–64		
Evesboro:				
3.1 miles north of Salisbury, southeast corner of Cop Station Road and Brown Road. (Modal profile)	S-45636	0–8		
	S-45637	8–54		
	S-45638	54–61		
0.7 mile east of Sharptown on south side of Cod Creek Road. (Coarse sand profile)	S-45639	0–10		
	S-45640	10–27		
	S-45641	27–48	100	94
1 mile west of State Route 12, 600 feet south of Dykes Road. (Thin solum profile)	S-45642	0–11		
	S-45643	11–39		
	S-45644	51–64		

See footnotes at end of table.

wildlife habitat and kinds of wildlife—Continued

Elements of wildlife habitat—Continued				Kinds of wildlife		
Coniferous woody plants	Wetland food and cover plants	Shallow water developments	Excavated ponds	Open-land wildlife	Woodland wildlife	Wetland wildlife
Fair	Good	Fair	Good	Fair	Fair	Good.
Good	Good	Good	Good	Poor	Good	Good.
Good	Good	Good	Good	Poor	Good	Good.
Fair	Good	Good	Good	Fair	Good	Good.
Poor	Not suited	Not suited	Not suited	Good	Good	Not suited.
Poor	Not suited	Not suited	Not suited	Good	Good	Not suited.
Fair	Good	Poor	Poor	Poor	Good	Poor.
Not suited	Good	Good	Good	Not suited	Poor	Good.
Not suited	Good	Poor	Not suited	Not suited	Not suited	Fair.
Poor	Poor	Poor	Poor	Good	Good	Poor.
Poor	Not suited	Not suited	Not suited	Good	Good	Not suited.

soil samples taken from 34 soil profiles

procedures of the American Association of State Highway Officials (AASHO) (1)]

Mechanical analyses [1]—Continued							Liquid limit	Plasticity index	Classification	
Percentage passing sieve—Continued			Percentage smaller than—							
No. 10 (2.0 mm.)	No. 40 (0.042 mm.)	No. 200 (0.074 mm.)	0.05 mm.	0.02 mm.	0.005 mm.	0.002 mm.			AASHO	Unified [2]
100	88	45	42	26	16	10	[3] NP	NP	A-4(2)	SM
100	89	49	46	43	39	34	32	14	A-6(4)	SC
100	99	72	66	53	41	35	33	14	A-6(9)	CL
100	91	40	37	27	17	13	NP	NP	A-4(1)	SM
100	95	69	64	57	48	45	49	26	A-7-6(15)	CL
100	99	91	86	58	36	30	40	18	A-6(11)	CL
100	91	64	60	45	23	15	20	3	A-4(6)	ML
100	99	87	84	75	60	54	60	32	A-7-6(20)	CH
100	96	52	50	47	42	37	41	21	A-7-6(8)	CL
100	91	70	68	47	19	10	22	4	A-4(7)	ML-CL
100	98	93	92	80	57	48	62	33	A-7-6(20)	CH
100	99	80	79	72	58	51	61	32	A-7-6(20)	MH-CH
100	85	12	10	9	6	5	NP	NP	A-2-4(0)	SP-SM
100	89	7	5	4	4	3	NP	NP	A-3(0)	SP
100	93	23	21	19	16	15	NP	NP	A-2-4(0)	SM
100	56	8	8	7	5	2	NP	NP	A-3(0)	SP-SM
100	60	11	11	9	7	6	NP	NP	A-2-4(0)	SW-SM
89	59	5	5	5	5	4	NP	NP	A-3(0)	SP-SM
100	81	12	11	10	9	6	NP	NP	A-2-4(0)	SP-SM
100	79	14	13	11	7	6	NP	NP	A-2-4(0)	SM
100	90	41	40	33	17	13	NP	NP	A-4(1)	SM

TABLE 5.—*Engineering test data for*

Soil series and location	BPR report number	Depth	Mechanical analyses [1]	
			Percentage passing sieve—	
			¾-in.	No. 4 (4.7 mm.)
		Inches		
Fallsington:				
2.5 miles east of Mardela Springs, 1.5 miles southeast of Mardela Road on south side of Ed Taylor Road. (Modal profile)	S-45600	4-13		
	S-45601	13-25		
	S-45602	35-46		
1 mile west of Athel, north side of Hurley Neck Road. (More sandy than modal)	S-45603	0-5		
	S-45604	15-23		
	S-45605	32-46		
2.5 miles east of Quantico, 0.1 mile southeast of State Route 349 on east side of Upper Ferry Road. (Fine sand profile)	S-45606	0-6		
	S-45607	13-24		
	S-45608	32-56		
Galestown:				
2.5 miles west of Mardela Springs, 1 mile north of U.S. Highway 50 on west side of Bradley Road. (Modal profile)	S-45609	8-32		
	S-45610	32-44		
	S-45611	44-70		
0.6 mile southwest of Sharptown on northwest side of State Route 313. (Finer textured than modal)	S-45612	4-22		
	S-45613	22-37		
	S-45614	40-55	100	99
1.25 miles west of Athel on Hurley Neck Road. (Sandy profile)	S-45615	0-9		
	S-45616	18-38		
	S-45617	47-72		
Keyport:				
2.7 miles southeast of Delmar, 1.25 miles south of Delaware line on east side of Foskey Lane. (Modal profile)	S-45618	0-8		
	S-45619	22-30		
	S-45620	30-43		
Klej:				
3 miles south of Salisbury airport, 1 mile north of Worcester County line on south side of Old Mount Olive Road. (Modal profile)	S-45627	1-8		
	S-45628	8-32		
	S-45629	42-55		
0.7 mile west of Melson on north side of Rum Ridge-Melson Road. (Finer textured than modal)	S-45630	0-9		
	S-45631	16-35		
	S-45632	35-55		
2 miles northwest of Mardela Springs, 0.25 mile north of U.S. Highway 50 on southwest side of Bradley Road. (Somewhat poorly drained profile)	S-45633	3-19		
	S-45634	28-46		
	S-45635	46-66	100	84
Matawan:				
1.5 miles southeast of Hebron, 1 mile south of U.S. Highway 50 and 300 feet west of Rockawalking Road. (Modal profile)	S-45645	0-6		
	S-45646	21-28		
	S-45647	38-60		
0.9 mile west of Delmar, 0.3 mile south of State Line Road on left side of Delmar Road. (Deep solum profile)	S-45648	0-10		
	S-45649	18-30		
	S-45650	30-39		
1.7 miles southeast of Salisbury city limits on west side of Johnson Road. (Thin solum profile)	S-45651	5-22		
	S-45652	28-35		
	S-45653	35-53		
1.4 miles southeast of Fruitland on south side of Jackson Road. (Finer textured than modal)	S-45621	0-8		
	S-45622	22-32		
	S-45623	32-49		
0.9 mile southeast of Delmar on west side of U.S. Highway 13. (Finer textured than modal)	S-45624	0-8		
	S-45625	17-25		
	S-45626	37-50		

See footnotes at end of table.

soil samples taken from 34 soil profiles—Continued

Mechanical analyses [1]—Continued							Liquid limit	Plasticity index	Classification	
Percentage passing sieve—Continued			Percentage smaller than—						AASHO	Unified [2]
No. 10 (2.0 mm.)	No. 40 (0.042 mm.)	No. 200 (0.074 mm.)	0.05 mm.	0.02 mm.	0.005 mm.	0.002 mm.				
100	83	33	32	25	13	9	15	2	A-2-4(0)	SM
100	84	28	27	22	14	11	14	2	A-2-4(0)	SM
100	88	24	22	14	8	6	NP	NP	A-2-4(0)	SM
100	69	20	19	13	8	4	NP	NP	A-2-4(0)	SM
100	88	39	37	28	16	11	NP	NP	A-4(1)	SM
100	65	16	16	14	11	9	NP	NP	A-2-4(0)	SM
100	87	38	36	30	19	14	19	2	A-4(1)	SM
100	86	43	42	38	27	23	21	9	A-4(2)	SC
100	70	17	16	13	9	7	NP	NP	A-2-4(0)	SM
100	63	7	7	7	7	6	NP	NP	A-3(0)	SP-SM
100	69	7	7	7	7	6	NP	NP	A-3(0)	SP-SM
100	66	5	5	5	5	5	NP	NP	A-3(0)	SP-SM
100	70	10	10	9	9	7	NP	NP	A-3(0)	SP-SM
100	68	9	9	8	8	7	NP	NP	A-3(0)	SP-SM
96	66	6	6	6	6	6	NP	NP	A-3(0)	SP-SM
100	59	6	6	6	5	4	NP	NP	A-3(0)	SP-SM
100	66	6	6	6	6	6	NP	NP	A-3(0)	SP SM
100	75	4	4	4	4	4	NP	NP	A-3(0)	SP
100	97	79	77	51	19	12	21	2	A-4(8)	ML
100	98	92	90	74	48	41	46	23	A-7-6(14)	CL
----------	100	95	94	72	45	40	45	22	A-7-6(14)	CL
100	80	12	10	9	7	5	NP	NP	A-2-4(0)	SP-SM
100	78	14	12	9	6	5	NP	NP	A-2-4(0)	SM
100	91	22	20	19	19	17	24	6	A-2-4(0)	SM-SC
100	77	10	10	9	8	6	NP	NP	A-3(0)	SP-SM
100	78	12	11	9	7	5	NP	NP	A-2-4(0)	SP-SM
100	73	7	5	4	4	4	NP	NP	A-3(0)	SP-SM
100	68	10	10	9	7	5	NP	NP	A-3(0)	SP-SM
100	71	2	2	2	2	2	NP	NP	A-3(0)	SP
76	36	6	6	6	6	6	NP	NP	A-2-4(0)	SW-SM
100	88	30	27	22	13	9	NP	NP	A-2-4(0)	SM
100	85	33	30	25	17	12	17	2	A-2-4(0)	SM
100	92	42	38	30	21	16	27	8	A-4(1)	SC
100	83	22	20	13	6	2	NP	NP	A-2-4(0)	SM
100	90	38	36	33	27	25	28	13	A-6(1)	SC
100	94	38	36	33	28	27	30	12	A-6(1)	SC
100	73	32	31	29	25	23	34	15	A-2-6(1)	SC
100	86	38	37	35	29	25	32	14	A-6(2)	SC
100	81	27	25	20	13	8	NP	NP	A-2-4(0)	SM
100	97	47	41	30	19	13	NP	NP	A-4(2)	SM
100	99	66	60	52	41	34	37	17	A-6(9)	CL
----------	100	39	34	32	26	22	25	6	A-4(1)	SM-SC
100	90	53	48	38	22	15	19	3	A-4(4)	ML
100	98	85	81	68	52	46	56	30	A-7-6(19)	CH
100	99	49	40	33	25	23	28	6	A 4(3)	SM-SC

TABLE 5.—*Engineering test data for*

Soil series and location	BPR report number	Depth	Mechanical analyses [1] Percentage passing sieve— ¾-in.	No. 4 (4.7 mm.)
		Inches		
Norfolk:				
0.5 mile north of Brewington Branch and 100 feet east of U.S. Highway 13. (Modal profile)	S-45654	9-28	----------	----------
	S-45655	35-43	----------	----------
	S 45656	49-54	----------	----------
2.5 miles west of Salisbury between Crooked Oak Lane and Levin Dashiell Road. (C horizon finer textured than in modal)	S-45657	0-11	----------	----------
	S-45658	27-40	----------	----------
	S-45659	40-58	----------	----------
2.1 miles southeast of Salisbury city limits on south side of State Route 12. (Finer textured than modal)	S-45660	9 24	100	99
	S-45661	30-45	100	97
	S-45662	60-63	100	99
Othello:				
0.7 mile east of Royal Oak on north side of Nanticoke Road. (Modal profile)	S-45663	2-11	----------	----------
	S-45664	11-28	----------	----------
	S-45665	35-55	100	99
1 mile west of Quantico on north side of Cherry Walk Road. (Profile in cultivated field)	S-45666	0-10	----------	----------
	S-45667	10-29	----------	----------
	S-45668	34-62	100	90
2.4 miles northeast of Green Hill on west side of Whitehaven Road. (Thin silt deposit)	S-45669	1-10	----------	----------
	S-45670	10-27	----------	----------
	S-45671	40-60	----------	----------
Plummer:				
West side of Woodland Avenue, south of Salisbury near Fountain Road. (Modal profile).	S-45672	1-8	----------	----------
	S-45673	8-30	----------	----------
	S-45674	30-45	----------	----------
4.2 miles west of Powellville; 0.8 mile west of Sixty Foot Road on north side of Mt. Hermon Road. (Finer textured than modal).	S-45675	0-12	----------	----------
	S-45676	12-21	----------	----------
	S-45677	36-50	----------	----------
1.3 miles east of Parsonsburg; 0.1 mile east of Reuben Esham Road on north side of U.S. Highway 50. (More poorly drained than modal)	S-45678	0-9	----------	----------
	S-45679	17-26	----------	----------
	S-45680	26-48	----------	----------
Portsmouth:				
2 miles north of Allen and 1 mile northeast of Upper Ferry Road on south side of Walnut Tree Road. (Modal profile)	S-45681	0-11	----------	----------
	S-45682	20-32	----------	----------
	S-45683	44-55	----------	----------
1.5 miles west of Shavox on south side of Shavox Road. (Sandy profile)	S-45684	0 8	----------	----------
	S-45685	17-30	----------	----------
	S-45686	37-47	----------	----------
3 miles south of Salisbury airport on south side of Old Mount Olive Road. (Sandy surface layer)	S-45687	0-8	----------	----------
	S 45688	24-54	----------	----------
	S-45689	54-65	----------	----------

[1] Mechanical analyses according to the AASHO Designation T 88 (*1*). Results by this procedure frequently differ from results obtained by the soil survey procedure of the Soil Conservation Service (SCS). In the AASHO procedure, the fine material is analyzed by the hydrometer method and the various grain-size fractions are calculated on the basis of all the material, including that coarser than 2 millimeters in diameter. In the SCS soil survey procedure, the fine material is analyzed by the pipette method and the material coarser than 2 millimeters in diameter is excluded from calculations of grain-size fractions. The mechanical analyses used in this table are not suitable for use in naming textural classes of soil.

soil samples taken from 34 soil profiles—Continued

Mechanical analyses [1]—Continued							Liquid limit	Plasticity index	Classification	
Percentage passing sieve—Continued			Percentage smaller than—							
No. 10 (2.0 mm.)	No. 40 (0.042 mm.)	No. 200 (0.074 mm.)	0.05 mm.	0.02 mm.	0.005 mm.	0.002 mm.			AASHO	Unified [2]
100	84	21	20	17	11	7	NP	NP	A–2–4(0)	SM
100	87	29	27	23	19	15	24	7	A–2–4(0)	SM–SC
100	78	18	17	15	11	9	NP	NP	A–2–4(0)	SM
100	72	18	16	12	8	4	NP	NP	A–2–4(0)	SM
100	72	29	28	26	24	19	20	4	A–2–4(0)	SM–SC
100	80	28	27	26	24	19	24	7	A–2–4(0)	SM–SC
98	77	17	16	14	11	7	NP	NP	A–2–4(0)	SM
95	70	29	27	25	21	18	26	8	A–2–4(0)	SC
97	63	19	18	17	16	14	25	5	A–2–4(0)	SM–SC
100	98	91	89	60	23	16	24	1	A–4(8)	ML
100	99	95	94	75	40	34	29	9	A–4(8)	CL
96	80	20	19	17	14	12	NP	NP	A–2–4(0)	SM
100	99	95	93	70	33	26	25	4	A–4(8)	ML–CL
100	99	96	94	71	40	35	38	17	A–6(11)	CL
79	48	13	13	11	9	6	NP	NP	A–2–4(0)	SM
100	98	85	83	59	23	16	23	2	A–4(8)	ML
100	98	83	81	68	40	33	28	9	A–4(8)	CL
100	90	27	26	21	13	11	NP	NP	A–2–4(0)	SM
100	75	10	9	8	7	6	NP	NP	A–3(0)	SP–SM
100	72	8	7	7	7	6	NP	NP	A 3(0)	SP–SM
100	58	3	3	3	2	2	NP	NP	A–3(0)	SP
100	90	19	17	15	13	10	NP	NP	A–2–4(0)	SM
100	90	23	20	18	14	11	NP	NP	A–2–4(0)	SM
100	83	8	6	5	5	4	NP	NP	A–3(0)	SP–SM
100	87	9	8	7	6	5	NP	NP	A–3(0)	SP–SM
100	88	22	21	18	14	11	NP	NP	A–2–4(0)	SM
100	87	7	6	4	4	4	NP	NP	A–3(0)	SP–SM
100	90	61	58	39	17	11	NP	NP	A–4(5)	ML
100	93	70	68	58	34	26	30	12	A–6(8)	CL
100	86	21	19	15	8	6	NP	NP	A–2–4(0)	SM
100	89	27	25	22	18	14	NP	NP	A–2–4(0)	SM
100	94	43	39	36	32	28	27	11	A 6(2)	SC
100	92	36	34	30	26	23	24	8	A–4(0)	SC
100	88	38	36	30	21	15	23	5	A–4(1)	SM–SC
100	92	63	60	52	40	35	39	19	A–6(9)	CL
100	96	53	51	46	40	36	38	18	A–6(7)	CL

[2] SCS and BPR have agreed to consider that all soils having plasticity indexes within two points from the A-line are to be given a borderline classification. Examples of borderline classifications obtained by this use are ML–CL, MH–CH, and SP SM.
[3] NP = Nonplastic.

TABLE 6.—*Estimated engineering*

Soil series and map symbols [1]	Depth to seasonal high water table	Depth from surface	Classification		
			USDA texture	Unified	AASHO
	Feet	*Inches*			
Bayboro (Ba, Bb)	0	0–10	Loam or silt loam	OL, ML, SM	A–4
		10–38	Light fine sandy clay, heavy fine sandy clay, or sandy clay.	CL or SC	A–6
		38–55	Light fine sandy clay loam.	CL or SC	A–6
		55–63	Loamy sand	SP–SM or SM	A–3 or A–2
Beaches (Be)	1–10+	0–60	Sand	SP	A–3
Downer (DoA, DoB2, DoC)	10+	0–18	Loamy sand	SP–SM or SM	A–2
		18–35	Sandy loam or heavy sandy loam.	SC or SM	A–2
		35–52	Loamy sand	SP-SM	A–3
Elkton:					
(Ea, Em, En)	0	0–13	Loam, silt loam, or silty clay loam.	ML	A–4 or A–6
		13–31	Silty clay or heavy clay loam.	CH or CL	A–7
		31–60	Silt loam	ML, MH, CL, CH	A–6 or A–7
(Ek)	0	0–13	Sandy loam	SM	A–2
		13–31	Silty clay or heavy clay loam.	CH or CL	A–7
		31–60	Heavy silt loam	ML or CL	A–4 or A–6
Evesboro:					
(EoD, ErD, EtF, EvD, EyC) (For properties of Galestown soils in mapping unit EvD and EyC and for properties of Downer soils in mapping unit EyC, refer to their respective series.)	10+	0–60	Loamy sand	SP SM	A 3
(EpB, EsB, EwB) (For properties of Galestown soils in mapping unit EwB, refer to the Galestown series.)	5+	0–41	Loamy sand	SP–SM or SM	A–3 or A–2
		41–60	Sandy loam	SM or SC	A–2 or A–4
Fallsington (Fa, Fg, Fs)	0	0–13	Fine sandy loam, loam, or sandy loam.	SM or ML	A–2 or A–4
		13–35	Sandy clay loam or heavy sandy loam.	SC or SM	A–2 or A–4
		35–46	Sand	SP or SP–SM	A–3 or A–2
		46–53	Sandy clay loam	SC	A–2 or A–4
		53–65	Sand	SP or SP–SM	A–3
Galestown:					
(GaD)	8+	0–55	Loamy sand	SP or SM	A–2 or A–3
		55–70	Sand	SP–SM	A–3
(GcB)	5+	0–55	Loamy sand	SP or SM	A–2 or A–3
		55–70	Sand	SP–SM	A–3
		70–80	Sandy loam	SC	A–2
Keyport (KeA, KeB)	1½–2	0–12	Silt loam	ML	A–4
		12–43	Silty clay or light silty clay	CL	A–6 or A–7
		43–60	Sandy clay loam	CL or SC	A–6
Klej (KsA, KsB)	2	0–42	Loamy sand	SM or SP–SM	A–2 or A–3
		42–55	Sandy loam	SM or SC	A–2
		55–66	Sandy clay	SC or CL	A–6

See footnotes at end of table.

properties of the soils

Percentage passing sieve— No. 4	Percentage passing sieve— No. 10	Percentage passing sieve— No. 200	Range in permeability	Available water capacity	Range in reaction [2]	Corrosion potential: Untreated steel pipes	Corrosion potential: Concrete pipes	Shrink-swell potential	Optimum moisture	Maximum dry density
			Inches per hour	*Inches per inch of depth*	*pH*				*Percent*	*Lbs. per cubic foot*
100	100	45–100	0. 20–0. 63	0. 23	4. 5–5. 0	High	High	High	----------	----------
100	100	45–90	<0. 20	. 21	4. 0–5. 0	High	High	High	20	91–100
100	100	40–60	<0. 20	. 18	4. 0–4. 5	High	High	Moderate	20	101–110
100	100	5–15	2. 0–6. 3	. 08	4. 5–5. 0	High	High	Low	10	101–110
100	100	0–5	6. 3+	----------	----------	High	High	Low	9	101–110
100	100	5–15	2. 0–6. 3	. 10	4. 5–5. 5	Low	High	Low	----------	----------
100	100	15–35	0. 63–2. 0	. 14	4. 5–5. 5	Low	High	Low	14	111–120+
100	100	5–10	6. 3+	. 08	4. 5–5. 5	Low	High	Low	10	101–110
100	100	50–85	0. 20–0. 63	. 21	4. 5–5. 0	High	High	Low	----------	----------
100	100	85–95	<0. 20	. 20	4. 0–5. 0	High	High	Moderate	18	91–110
100	100	60–80	<0. 20	. 21	4. 0–5. 0	High	High	Low	15	101–110
100	100	15–35	0. 63–2. 0	. 14	4. 5–5. 0	High	High	Low	----------	----------
100	100	70–95	<0. 20	. 20	4. 0–5. 0	High	High	Moderate	18	91–110
100	100	55–90	<0. 20	. 21	4. 0–5. 0	High	High	Low	15	101–110
90–100	90–100	5–10	6. 3+	. 06	4. 0–5. 0	Low	High	Low	10	101–110
90–100	90–100	5–15	6. 3+	. 06	4. 0–5. 0	Low	High	Low	10	101–110
100	100	20–40	0. 20–2. 0	. 12	4. 0–5. 0	Low	High	Low	12	111–120+
100	100	30–55	0. 63–2. 0	. 18	4. 5–5. 0	High	High	Low	----------	----------
100	100	25–45	0. 63–2. 0	. 21	4. 0–5. 0	High	High	Low	12	111–120+
100	100	0–10	2. 0–6. 3	. 07	4. 0–5. 0	High	High	Low	10	101–110
100	100	25–45	0. 20–6. 3	. 17	4. 0–5. 0	High	High	Low	12	120+
100	100	0–10	2. 0–6. 3	. 07	4. 0–5. 0	High	High	Low	10	101–110
100	100	5–15	6. 3+	. 08	4. 0–5. 0	Low	High	Low	10	101–110
95–100	95–100	5–10	6. 3+	. 06	4. 0–5. 0	Low	High	Low	10	101–110
100	100	5–15	6. 3+	. 08	4. 0–5. 0	Low	High	Low	10	101–110
95–100	95–100	5–10	6. 3+	. 06	4. 0–5. 5	Low	High	Low	10	101–110
95–100	95–100	15–35	0. 20–0. 63	. 12	4. 5–6. 0	Low	High	Low	12	111–120+
100	100	75–95	0. 20–2. 0	. 21	4. 0–5. 0	High	High	Low	----------	----------
100	100	85–95	<0. 20	. 21	4. 0–5. 0	High	High	Moderate	17	91–110
100	100	40–60	<0. 20	. 18	4. 0–5. 0	High	High	Low	14	111–120+
100	100	5–15	0. 63–6. 3	. 08	4. 5–5. 5	High	High	Low	12	101–110
100	100	15–25	2. 0–6. 3	. 14	4. 5–5. 0	High	High	Low	14	111–120
95–100	85–100	40–60	0. 20–0. 63	. 15	4. 5–5. 0	High	High	Low	15	101–120

TABLE 6.—*Estimated engineering*

Soil series and map symbols [1]	Depth to seasonal high water table	Depth from surface	Classification		
			USDA texture	Unified	AASHO
	Feet	*Inches*			
Leon (Le)	1	0–16	Loamy sand	SM or SP–SM	A–1, A–3 or A–2.
		16–30	Light loamy sand [3]	SM or SP–SM	A–1
		30–61	Sand or very light loamy sand.	SP or SP–SM	A–1 or A–3
		61–70	Light sandy loam	SM or SC	A–2
Matapeake (MdA, MdB2, MeA, MeB2, MeC)	5+	0–11	Fine sandy loam or silt loam.	ML	A–4
		11–34	Silt loam	ML or CL	A–6
		34–38	Sandy loam or light sandy clay loam.	ML	A–4
		38–58	Light sandy loam or heavy loamy sand.	SM	A–2
		58–62	Loamy sand	SP–SM or SM	A–3 or A–2
Matawan:					
(MfA, MfB, MnA, MnB)	2	0–21	Fine sandy loam or sandy loam.	SM or ML	A–2 or A–4
		21–60	Sandy clay loam or clay loam.	SC or CL	A–2 or A–6
(MmA, MmB, MmC, MmE)	2	0–28	Loamy sand	SM or SP–SM	A–1 or A–3
		28–60	Sandy clay loam or clay loam.	SC or CL	A–4, A–6, or A–2.
Mattapex (MpA, MpB, MtA, MtB)	2	0–11	Loam or silt loam	ML	A–4
		11–39	Silty clay loam or loam.	ML or CL	A–6
		39–46	Sandy loam	SM	A–2
		46–66	Loamy sand	SP–SM	A–3
Muck (Mu)	0	0–25	Muck	Pt	
		25–49	Muck mixed with silt and clay.	OL	A–4 or A–5
		49–60	Sand	SP or SP–SM	A–3 or A–1
Norfolk (NoA, NoB, NoC, NsD, NsE)	10+	0–18	Loamy sand	SM	A–2
		18–49	Sandy loam or light sandy clay loam.	SC or SM	A–2
		49–54	Loamy sand	SM or SP–SM	A–2 or A–3
Othello (Ot, Ow [4])	0	0–11	Silt loam	ML	A–4
		11–35	Light silty clay loam or silty clay loam.	CL or ML	A–6 or A–4
		35–68	Loamy sand	SP–SM or SM	A–3 or A–9
Plummer (Pe)	0	0–30	Loamy sand	SM or SP–SM	A–2 or A–3
		30–85	Sand	SP or SP–SM	A–1 or A–3
Pocomoke (Pk, Po)	0	0–18	Loam or sandy loam	SM or ML	A–2 or A–4
		18–33	Light sandy clay loam or sandy loam.	SC	A–2 or A–4
		33–56	Loamy sand	SP–SM	A–3
		56–60	Loam	SM or ML	A–2 or A–4
		60–70	Fine sand	SP or SP–SM	A–3 or A–1
Portsmouth (Pr, Pt)	0	0–16	Sandy loam or silt loam.	SM, ML, OL	A–2, A–4, A–5
		16–32	Heavy silt loam or silty clay loam.	CL or SC	A–6
		32–55	Loamy sand	SM	A–2
Rutlege (Ru)	0	0–24	Loamy sand	SM or SP–SM	A–2 or A–3
		24–50	Sand	SP or SP–SM	A–3 or A–1

See footnotes at end of table.

properties of the soils—Continued

Percentage passing sieve—			Range in permeability	Available water capacity	Range in reaction [2]	Corrosion potential		Shrink-swell potential	Optimum moisture	Maximum dry density
No. 4	No. 10	No. 200				Untreated steel pipes	Concrete pipes			
			Inches per hour	*Inches per inch of depth*	*pH*				*Percent*	*Lbs. per cubic foot*
100	100	5–15	6. 3+	. 08	4. 0–5. 0	High	High	Low	----------	----------
100	100	5–15	2. 0–6. 3	. 10	4. 0–5. 0	High	High	Low	12	101–110
100	100	0–10	6. 3+	. 06	4. 0–5. 0	High	High	Low	12	101–110
100	100	10–25	2. 0–6. 3	. 14	4. 0–5. 0	High	High	Low	10	111–120
100	100	60–80	0. 63–2. 0	. 21	5. 0 6. 0	Low	Moderate	Low	----------	----------
100	100	65–90	0. 20–0. 63	. 21	4. 5–5. 5	Moderate	Moderate	Moderate	15	101–110
100	100	60 80	0. 63 2. 0	. 21	4. 0–5. 0	Low	High	Low	14	101–110
90–100	85–100	15–35	0. 63–2. 0	. 18	4. 0–5. 0	Low	High	Low	12	111–120
95–100	90–100	5–15	2. 0–6. 3	. 08	4. 0–5. 0	Low	High	Low	10	101–110
100	100	20–55	0. 63–2. 0	. 18	4. 0–5. 0	Low	High	Low	14	101–110
100	100	20–60	0. 06 0. 63	. 21	4. 0–5. 0	Moderate	High	Low	15	111–120+
100	100	0–20	2. 0 6. 3	. 10	4. 0–5. 0	Low	High	Low	12	101–110
100	100	30–60	0. 06–0. 63	. 21	4. 0–5. 0	Moderate	High	Low	15	111–120+
100	100	60–85	0. 63–2. 0	. 21	4. 5–5. 5	Moderate	Moderate	Low	----------	----------
100	100	65–95	0. 20–0. 63	. 21	4. 0–5. 0	High	High	Moderate	15	101–110
95–100	90–100	15–25	0. 63–2. 0	. 18	4. 0–5. 0	High	High	Low	12	101–120
95–100	90–100	5–10	2. 0–6. 3+	. 08	4. 0–5. 0	High	High	Low	10	101–110
----------	----------	----------	----------	----------	3. 5–5. 0	High	High	High	----------	----------
100	100	70–90	<0. 20	----------	3. 5–5. 0	High	High	High	----------	----------
100	100	0–10	2. 0–6. 3+	. 06	3. 5–4. 5	High	High	Low	10	101–110
95–100	95–100	15–25	2. 0–6. 3	. 12	4. 0–5. 0	Low	High	Low	----------	----------
95–100	95–100	25–35	0. 63–2. 0	. 14	4. 0–5. 0	Low	High	Low	14	111–120+
95–100	90–100	10–30	2. 0–6. 3	. 10	4. 0–5. 0	Low	High	Low	12	101–110
100	100	75–95	0. 20–2. 0	. 21	4. 0–5. 0	High	High	Low	----------	----------
100	100	80–100	0. 20–0. 63	. 21	4. 0–5. 0	High	High	Moderate	15	101–110
95–100	80–100	10–30	2. 0–6. 3	. 08	4. 0–5. 0	High	High	Low	10	101–110
100	100	5–25	2. 0–6. 3	. 08	4. 0–5. 0	High	High	Low	12	101–110
100	100	2–8	6. 3+	. 06	4. 0–5. 0	High	High	Low	10	101–110
100	100	25–55	0. 63–2. 0	. 18	4. 0–5. 0	High	High	Low	----------	----------
100	100	20–45	0. 63–2. 0	. 21	4. 0–5. 0	High	High	Low	12	111–120+
100	100	5–10	2. 0–6. 3	. 08	4. 0–5. 0	High	High	Low	10	101–110
100	100	25–55	0. 63–2. 0	. 18	4. 0 5. 0	High	High	Low	12	101–120
100	100	0–10	2. 0–6. 3	. 06	4. 0–5. 0	High	High	Low	10	101–110
100	100	30–65	0. 20-2. 0	. 20	4. 0–5. 0	High	High	Low	----------	----------
100	100	40–70	0. 20–0. 63	. 21	4. 0–5. 0	High	High	Moderate	15	101–110
100	100	15–25	0. 63–6. 3	. 10	4. 0–5. 0	High	High	Low	12	101–110
100	100	55–20	2. 0–6. 3	. 14	4. 0–5. 0	High	High	Low	----------	----------
95–100	95–100	0–10	6. 3+	. 06	4. 0–5. 0	High	High	Low	10	101–110

TABLE 6.—*Estimated engineering*

Soil series and map symbols [1]	Depth to seasonal high water table	Depth from surface	Classification		
			USDA texture	Unified	AASHO
	Feet	*Inches*			
Sassafras (SaA, SaB, SsA, SsB2, SsC2)	5+	0–15	Fine sandy loam or sandy loam.	SM	A–2 or A–4
		15–34	Sandy clay loam or heavy sandy loam.	SM or CL	A–6
		34–67	Light sandy loam or loamy sand.	SM or SP	A–2 or A–3
St. Johns (St, Su)	0	0–25	Loamy sand or mucky loamy sand.	SM or SP	A–1 or A–3
		25–35	Loamy sand [3]	SM or SP–SM	A–1 or A–3
		35–40	Silt loam	ML	A–4
		40–58	Sand	SP or SP–SM	A–1 or A–3
Tidal marsh (Tm)	0	0–60	Variable		
Woodstown (WfA, WfB, WoA, WsA, WsB)	1½–2	0–13	Fine sandy loam, loam, or sandy loam.	SM or ML	A–2 or A–4
		13–40	Sandy clay loam or light sandy clay loam.	SC or CL	A–2 or A–6
		40–50	Sand	SP or SP–SM	A–1 or A–3

[1] Properties are not shown in this table for Borrow pits (Bo), Made land (Ma), Mixed alluvial land (Mv), and Swamp (Sw).
[2] Reaction is for unlimed soils; where soils have been limed, the pH is higher.
[3] A moderately to strongly cemented organic pan.

TABLE 7.—*Engineering*

Soil series and map symbols [1]	Suitability for earthwork when soil is—		Susceptibility to frost action	Suitability as source of—			Soil features that affect—	
	Wet	Frozen		Topsoil [2]	Sand and gravel	Road fill	Pipeline construction and maintenance [3]	Road and highway location
Bayboro (Ba, Bb)	Unsuitable.	Unsuitable.	Severe	Good [5]	Fair for sand.	Very poor to fair.	High water table.	High water table; very poor stability; severe frost action.
Beaches (Be) (Soil features variable. Onsite investigation necessary.)	Good	Good	None to slight.	Unsuitable.	Good for sand.	Poor		
Downer (DoA, DoB2, DoC)	Fair to good.	Fair to good.	Slight to moderate.	Fair	Good for sand.	Fair to good.	Very deep water table.	Fair stability; slight to moderate frost action; slopes erodible.
Elkton (Ea, Ek, Em, En)	Very poor.	Unsuitable.	Severe	Poor to fair.	Unsuitable.	Poor	High water table.	High water table; poor stability; severe frost action.

See footnotes at end of table.

properties of the soils—Continued

Percentage passing sieve— No. 4	No. 10	No. 200	Range in permeability	Available water capacity	Range in reaction [2]	Corrosion potential: Untreated steel pipes	Corrosion potential: Concrete pipes	Shrink-swell potential	Optimum moisture	Maximum dry density
			Inches per hour	*Inches per inch of depth*	*pH*				*Percent*	*Lbs. per cubic foot*
100	100	30–50	0. 63–2. 0	. 15	4. 5–5. 5	Low	High	Low	----------	----------
100	100	35–60	0. 63–2. 0	. 21	4. 5–5. 5	Low	High	Low	14	111–120+
95–100	95–100	5–20	2. 0–6. 3	. 08	4. 5–5. 5	Low	High	Low	12	101–120
100	100	5–15	2. 0–6. 3	. 10	4. 0–5. 0	High	High	Low	----------	----------
100 100 100	100 100 100	5–15 60–80 0–10	2. 0–6. 3 0. 20–0. 63 6. 3+	. 10 . 21 . 06	4. 0–5. 0 4. 0–5. 0 4. 0–5. 0	High High High	High High High	Low Low Low	12 15 10	101–110 101–110 101–110
----------	----------	----------	----------	----------	----------	High	High	----------	----------	----------
100	100	30–60	0. 63–2. 0	. 18	4. 5–5. 5	Low	High	Low	----------	----------
100	100	30–60	0. 63–2. 0	. 21	4. 5–5. 5	Moderate	High	Low	12	111–120+
95–100	90–100	0–10	2. 0–6. 3+	. 06	4. 5–5. 5	Moderate	High	Low	10	101–110

[4] Othello silt loam, low (Ow) is sometimes flooded when the tide is high; in this soil the 35- to 68-inch horizon commonly has a lower pH than that listed in the table.

interpretations

Soil features that affect—Continued: Sites for ponds and reservoirs	Dikes, levees, and other embankments	Drainage systems	Irrigation	Terraces or diversions	Waterways [4]	Suitable type of pond
Seepage very slow in subsoil but rapid in substratum; high water table.	Very poor stability; highly erodible; low strength; wet borrow.	Very slowly permeable; highly erodible; high water table.	High available moisture capacity; slow infiltration; very poor drainage.	Highly erodible; very poor stability; high water table.	High available moisture capacity; moderate fertility; high water table; erodible.	Excavated.
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Moderate seepage in subsoil; excessive seepage in substratum.	Fair stability; erodible.	Not needed	Low available moisture capacity; rapid infiltration; low fertility.	Slightly erodible; fair stability; low fertility.	Low available moisture capacity; low fertility; erodible.	Not suitable.
Very slow seepage; high water table.	Poor stability; highly erodible; wet borrow.	Very slowly permeable; highly erodible; high water table.	High available moisture capacity; slow infiltration; poor drainage; high water table.	Highly erodible; poor stability; high water table.	High available moisture capacity; moderate fertility.	Excavated or impounded.

TABLE 7.—*Engineering*

Soil series and map symbols [1]	Suitability for earthwork when soil is—		Susceptibility to frost action	Suitability as source of—			Soil features that affect—	
	Wet	Frozen		Topsoil [2]	Sand and gravel	Road fill	Pipeline construction and maintenance [3]	Road and highway location
Evesboro: (EoD, ErD, EtF, EvD, EyC). (For interpretations of Galestown soil in mapping units EvD and EyC, refer to mapping unit GaD. For interpretations of Downer soil in mapping unit EyC, refer to the Downer series.)	Good	Good	None to slight.	Poor to fair.	Good for sand.	Poor	Very deep water table.	Fair stability; loose; slopes erodible; droughty.
(EpB, EsB, EwB) (For interpretations of Galestown soil in mapping unit EwB, refer to mapping unit GcB.)	Good	Good	None to slight.	Poor to fair.	Good for sand.	Poor to good.	Water table at depth of 5 feet or more.	Fair stability; erodible; droughty; may have seasonal seepage.
Fallsington (Fa, Fg, Fs)	Poor	Unsuitable.	Severe	Fair to good.	Fair for sand.	Poor to good.	High water table; running sand in deep excavations.	High water table; fair to good stability; severe frost action.
Galestown: (GaD)	Good	Good	None to slight.	Poor to fair.	Good for sand.	Poor	Very deep water table.	Fair stability; droughty; erodible.
(GcB)	Good	Good	None to slight.	Unsuitable.	Unsuitable.	Good	Depth to water table 5 feet or more.	Fair stability; droughty; erodible.
Keyport (KeA, KeB)	Very poor.	Unsuitable.	Severe	Fair to good.	Unsuitable.	Poor	Seasonal high water table.	Seasonal high water table; poor to fair stability; severe frost action.
Klej (KsA, KsB)	Fair to good.	Fair	Moderate	Fair	Fair for sand and gravel.	Poor to good.	Seasonal high water table; running sand in deep trenches.	Seasonal high water table; fair stability; moderate frost action; erodible.

See footnotes at end of table.

interpretations—Continued

Soil features that affect—Continued							Suitable type of pond
Sites for ponds and reservoirs	Dikes, levees, and other embankments	Drainage systems	Irrigation	Terraces or diversions	Waterways [4]		
Excessive seepage	Fair stability; erodible.	Not needed; excessively drained.	Low available moisture capacity; very rapid infiltration; low fertility.	Erodible; fair stability.	Low available moisture capacity; low fertility.		Not suitable.
Excessive seepage.	Fair stability; erodible.	Not needed; seasonal seepage in some areas.	Low available moisture capacity; very rapid infiltration.	Erodible; fair stability.	Low available moisture capacity; low fertility.		Not suitable.
Moderate seepage in subsoil; rapid seepage in substratum; high water table.	Fair stability for low embankments; moderately erodible.	Moderately permeable; moderately erodible; high water table.	Moderate available moisture capacity; medium infiltration; poor drainage; high water table.	Moderately erodible; fair to good stability; high water table.	Moderate available moisture capacity; moderate fertility; moderately erodible.		Excavated or impounded.
Excessive seepage	Fair stability; slightly erodible; pervious.	Not needed	Low available moisture capacity; very rapid infiltration; low fertility.	Slightly erodible; fair stability.	Low available moisture capacity; low fertility.		Impounded.[6]
Excessive seepage in subsoil; moderate seepage in substratum.	Stability fair above substratum, good in it; slightly erodible.	Not needed	Low available moisture capacity; very rapid infiltration; low fertility.	Slightly erodible; fair stability.	Low available moisture capacity; low fertility.		Impounded.
Slow seepage; seasonal high water table.	Poor to fair stability; highly erodible; impervious; fair compaction.	Very slowly permeable; highly erodible; seasonal high water table.	High available moisture capacity; slow infiltration; impeded drainage.	Highly erodible; poor to fair stability; seasonal high water table.	High available moisture capacity; moderate fertility; erodible.		Impounded or excavated.
Rapid seepage in surface layer and subsoil; moderate seepage in substratum; seasonal high water table.	Fair stability; erodible.	Rapidly permeable; erodible; seasonal high water table.	Low available moisture capacity; rapid infiltration; impeded drainage.	Erodible; fair stability; low fertility.	Low available moisture capacity; low fertility.		Impounded.

TABLE 7.—*Engineering*

Soil series and map symbols [1]	Suitability for earthwork when soil is—		Susceptibility to frost action	Suitability as source of—			Soil features that affect—	
	Wet	Frozen		Topsoil [2]	Sand and gravel	Road fill	Pipeline construction and maintenance [3]	Road and highway location
Leon (Le)	Fair to good.	Poor to fair.	Moderate to severe.	Fair	Fair	Poor to good.	High water table; running sand in deep trenches; cemented pan may be present.	High water table; poor stability; severe frost action; erodible; shallow; cemented pan may be present.
Matapeake (MdA, MdB2, MeA, MeB2, MeC).	Fair	Poor	Moderate	Good	Fair for sand and gravel.	Fair to good.	Very deep water table.	Fair to good stability; moderate frost action; steep slopes; erodible.
Matawan: (MfA, MfB, MnA, MnB)	Fair	Fair	Severe	Fair	Unsuitable.	Fair to good.	Seasonal high water table.	Seasonal high water table; fair stability; moderate to severe frost action; slope.
(MmA, MmB, MmC, MmE).	Fair	Fair	Moderate	Poor	Fair for sand.	Poor to good.	Seasonal high water table.	Seasonal high water table; fair stability; moderate to severe frost action; slope.
Mattapex (MpA, MpB, MtA, MtB)	Poor	Unsuitable.	Severe	Good	Fair for sand and gravel.	Fair to good.	Seasonal high water table.	Seasonal high water table; fair stability; severe frost action.
Mixed alluvial land (Mv) (Soil features variable; onsite investigation necessary.)	Fair to unsuitable.	Generally unsuitable.	Severe	Variable	Variable	Variable		
Muck (Mu)	Poor	Unsuitable.	Severe	Good [5]	Unsuitable.	Unsuitable.	High water table.	High water table; little or no stability; severe frost action; ponding and flooding.
Norfolk (NoA, NoB, NoC, NsD, NsE). (For interpretations of Sassafras in mapping units NsD and NsE, refer to the Sassafras series.)	Fair to good.	Fair to good.	Slight to moderate.	Fair	Good for sand; fair for gravel.	Fair to good.	Very deep water table.	Fair stability; slight to moderate frost action slope.

See footnotes at end of table.

interpretations—Continued

Soil features that affect—Continued						Suitable type of pond
Sites for ponds and reservoirs	Dikes, levees, and other embankments	Drainage systems	Irrigation	Terraces or diversions	Waterways [4]	
Excessive seepage; seasonal high water table; cemented pan may be present.	Poor stability; erodible.	Rapidly permeable; erodible; seasonal high water table; cemented pan may be present.	High water table; low available moisture capacity; rapid infiltration; poor drainage; low fertility.	Erodible; poor stability; cemented pan may be present.	Low available moisture capacity; very low fertility; may have cemented pan.	Impounded or excavated.
Moderate seepage in subsoil; rapid seepage in substratum.	Fair stability; moderately erodible.	Not needed	High available moisture capacity; medium infiltration.	Moderately erodible; fair to good stability.	High available moisture capacity; moderate fertility; erodible.	Impounded.[6]
Moderate seepage; sand layers in substratum; seasonal high water table.	Fair stability; erodible.	Moderately slowly permeable; erodible; seasonal high water table.	Low to moderate available moisture capacity; medium to rapid infiltration; impeded drainage.	Erodible; fair stability; seasonal high water table.	Low to moderate available moisture capacity and fertility; seasonal high water table.	Impounded.
Moderate seepage; sand layers in substratum; seasonal high water table.	Fair stability; erodible.	Moderately slowly permeable; erodible; seasonal high water table.	Low to moderate available moisture capacity; medium to rapid infiltration; impeded drainage.	Erodible; fair stability; seasonal high water table.	Low to moderate available moisture capacity and fertility; seasonal high water table.	Impounded.
Moderate seepage in subsoil; rapid seepage in substratum; seasonal high water table.	Fair stability; highly erodible.	Moderately slowly permeable; highly erodible; seasonal high water table.	High available moisture capacity; medium infiltration.	Highly erodible; fair stability.	High available moisture capacity; moderate fertility; erodible.	Impounded and excavated.[6]
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Variable seepage	Little or no stability; high shrinkage.	Moderately permeable; high shrinkage.	Undetermined available moisture capacity and infiltration rate; very poor drainage.	Little or no stability.	Low fertility	Excavated and impounded.
Moderate seepage in subsoil; excessive seepage in substratum.	Fair stability; slightly erodible.	Not needed	Low available moisture capacity; rapid infiltration.	Slightly erodible; fair stability.	Low available moisture capacity; low fertility.	Impounded.[6]

TABLE 7.—*Engineering*

Soil series and map symbols [1]	Suitability for earthwork when soil is— Wet	Suitability for earthwork when soil is— Frozen	Susceptibility to frost action	Suitability as source of— Topsoil [2]	Suitability as source of— Sand and gravel	Suitability as source of— Road fill	Soil features that affect— Pipeline construction and maintenance [3]	Soil features that affect— Road and highway location
Othello:								
(Ot)	Very poor.	Unsuitable.	Severe	Poor to fair.	Unsuitable.	Poor to fair.	High water table.	High water table; poor stability; severe frost action.
(Ow)	Very poor.	Unsuitable.	Severe	Poor to fair.	Unsuitable.	Poor to fair.	High water table.	High water table; poor stability; severe frost action; hazard of tidal flooding.
Plummer (Pe)	Good	Poor	Severe	Poor	Good for sand; fair for gravel.	Poor	High water table; running sand in trenches.	High water table; poor stability; severe frost action; ponding; pervious substratum.
Pocomoke (Pk, Po)	Very poor.	Unsuitable.	Severe	Good [5]	Fair for sand.	Fair to good.	High water table; running sand in deep trenches.	High water table; fair stability; severe frost action; ponding.
Portsmouth (Pr, Pt)	Very poor.	Unsuitable.	Severe	Good [5]	Fair for sand.	Poor to fair.	High water table.	High water table; poor stability; severe frost action; ponding.
Rutlege (Ru)	Poor	Very poor.	Severe	Fair [5]	Fair to good for sand.	Very poor.	High water table; running sand in trenches.	High water table; very poor stability; severe frost action; ponding; running sand in excavations.
Sassafras (SaA, SaB, SsA, SsB2, SsC2).	Fair	Fair	Moderate	Good	Fair for sand and gravel.	Fair to good.	Very deep water table.	Good stability; moderate frost action; slope.
St. Johns (St, Su)	Poor	Very poor.	Severe	Fair [5]	Fair for sand.	Very poor.	High water table; cemented pan may be present.	High water table; very poor stability; severe frost action; ponding; cemented pan may be present.

See footnotes at end of table.

interpretations—Continued

Soil features that affect—Continued							
Sites for ponds and reservoirs	Dikes, levees, and other embankments	Drainage systems	Irrigation	Terraces or diversions	Waterways [4]	Suitable type of pond
Excessive seepage in substratum; high water table.	Fair stability; moderately erodible; pervious substratum.	Slowly permeable; moderately erodible; high water table.	High available moisture capacity; medium infiltration; poor drainage.	Moderately erodible; poor stability.	High available moisture capacity; moderate fertility.	Impounded or excavated.
Excessive seepage in substratum; high water table.	Fair stability; moderately erodible; pervious substratum.	Slowly permeable; moderately erodible; high water table.	High available moisture capacity; medium infiltration; poor drainage.	Moderately erodible; poor stability.	High available moisture capacity; moderate fertility; salinity hazard.	Impounded or excavated.
Excessive seepage; high water table.	Poor stability; erodible; pervious.	Rapidly permeable; erodible; high water table.	Very low available moisture capacity; rapid infiltration; poor drainage.	Erodible; poor stability; high water table.	Very low available moisture capacity; very low fertility; high water table.	Excavated.
High water table; moderate seepage in subsoil; rapid seepage in substratum.	Fair stability; erodible.	Moderately permeable; erodible.	Moderate available moisture capacity; medium infiltration; very poor drainage.	Erodible; fair stability.	Moderate available moisture capacity; moderate fertility.	Excavated or impounded.
Slow seepage in subsoil; moderate to rapid seepage in substratum; high water table.	Poor stability; erodible; wet borrow.	Slowly permeable; erodible; high water table.	Moderate available moisture capacity; medium infiltration; very poor drainage.	Erodible; poor stability; high water table.	Moderate available moisture capacity; moderate fertility.	Excavated or impounded.
Excessive seepage; high water table.	Very poor stability; erodible.	Rapidly permeable; erodible; high water table.	Very low available moisture capacity; rapid infiltration; very poor drainage; high water table.	Erodible; very poor stability; high water table.	Very low available moisture capacity; low fertility.	Excavated.
Moderate seepage in subsoil; rapid seepage in substratum.	Good stability; erodible.	Not needed-----	Moderate available moisture capacity; medium infiltration.	Erodible; good stability.	Moderate available moisture capacity; moderate fertility; erodible.	Impounded.
Excessive seepage; high water table.	Very poor stability; erodible.	Rapidly permeable; erodible; high water table; cemented pan may be present.	Low to very low available moisture capacity; rapid infiltration; very poor drainage; high water table.	Erodible; very poor stability; high water table; cemented pan may be present.	Low to very low available moisture capacity and fertility; may have cemented pan.	Excavated.

TABLE 7.—*Engineering*

Soil series and map symbols [1]	Suitability for earthwork when soil is—		Susceptibility to frost action	Suitability as source of—			Soil features that affect—	
	Wet	Frozen		Topsoil [2]	Sand and gravel	Road fill	Pipeline construction and maintenance [3]	Road and highway location
Swamp (Sw) (Soil features variable. Onsite investigation necessary.)	Variable	Unsuitable.	Severe	Unsuitable.	Variable	Unsuitable.	----------	----------
Tidal marsh (Tm)	Variable	Unsuitable.	Severe	Unsuitable.	----------	Unsuitable.	High tidal water table.	High tidal water table and flooding; generally very poor stability; severe frost action.
Woodstown (WfA, WfB, WoA, WsA, WsB).	Fair	Poor	Severe	Good	Fair for sand.	Fair to good.	Seasonal high water table; running sand in substratum.	Seasonal high water table; good stability; severe frost action.

[1] Interpretations are not given in this table for Borrow pits (Bo) and Made land (Ma).
[2] Rating for topsoil is given for the surface layer only, or an average depth of 10 inches, whichever is less.
[3] The soil features listed that affect suitability for pipelines do not include the corrosive properties of soils. See table 6 for ratings of corrosion potential.

Depth to a seasonal high water table refers to the highest level at which the ground water stands for a significant period of time.

The permeability of a soil horizon is the rate at which water moves through undisturbed soil material. It depends largely on the texture and structure of the soils.

Available water capacity is approximately the moisture held in the range between field capacity and the wilting point. It is expressed in table 6 as inches of water per inch of soil.

Corrosion potential refers to the deterioration of concrete or untreated steel pipelines as a result of exposure to oxygen and moisture and to chemical and electrolytic reactions.

Shrink-swell potential indicates the volume changes that can be expected with changes in moisture content. It depends largely on the kind and amount of clay in a horizon. In Wicomico County the shrink-swell potential is high in only a few soils, and it is moderate in only specified horizons of a few other soils. Most soils in the county have low shrink swell potential.

Optimum moisture is the moisture content at which the soil can be compacted to a maximum dry density. The estimated percentages in table 6 are averages and, for each soil horizon, can be expected to vary a little.

Maximum dry density is the greatest amount of dry soil, by weight, that can be compacted into a given unit of volume, under controlled conditions and by standard procedures. In the table it is expressed as pounds of soil per cubic foot.

Engineering interpretations

Table 7 rates the soils in Wicomico County according to their suitability for earthwork, both when the soils are wet and when they are frozen. It also rates the soils according to their susceptibility to frost action and their suitability as sources of topsoil, sand and gravel, and road fill.

In addition, table 7 lists soil features that affect different kinds of engineering work. The features shown are those that affect the construction and maintenance of pipelines; the location of roads and highways; sites for ponds and reservoirs; use of soil materials for dikes, levees, and other embankments; drainage systems; irrigation practices; and the construction of terraces, diversions, and waterways. Shown in the last column of the table is the type of pond that is suitable for the soils of each series. The interpretations are based on information in tables 5 and 6 and on the experience of engineers in the county.

A soil that is suitable for one engineering purpose may be poor or even unsuitable for some other use. Bayboro silt loam, for example, is well suited as a site for a reservoir but is unsuitable as a source of sand. In contrast, the Galestown soils are a good source of sand, but they generally are not suitable for a reservoir site, because they are subject to excessive seepage.

Table 7 indicates both the good and the undesirable features of a soil that may require special consideration before a structure is planned, designed, and constructed. A subsoil of silty clay, such as that in the Elkton soils, has characteristics that make it poor for an earthen embankment

interpretations—Continued

Soil features that affect—Continued						Suitable type of pond
Sites for ponds and reservoirs	Dikes, levees, and other embankments	Drainage systems	Irrigation	Terraces or diversions	Waterways [4]	
Variable seepage	Generally very poor stability; erodibility not estimated.	Not feasible	Not feasible	Not feasible	Not feasible	Excavated.
Seasonal high water table; moderate seepage in subsoil; rapid seepage in substratum.	Good stability; erodible.	Seasonal high water table; moderately permeable; erodible; running sand in substratum.	Moderate available moisture capacity; medium infiltration; impeded drainage.	Erodible; good stability; seasonal high water table.	Moderate available moisture capacity; moderate fertility.	Impounded or excavated.

[4] The features listed are those of surface layer only.
[5] These soils have a high to very high organic-matter content in the surface layer.
[6] Ponds on these soils almost invariably need artificial treatment that seals them against excessive water losses. Sealing may also be needed on other soils in the county.

or dam. Such a subsoil is unstable and highly erodible, and it cannot be compacted to a suitable dry density. Because the subsoil material is very slowly permeable, however, it may be suitable as a core of a dam, used to reduce seepage. Fine texture and slow permeability in a subsoil increase the difficulty of providing adequate drainage for such soils, and they limit the suitability of the soils for irrigation.

The choice of a soil suitable for laying a pipeline is determined primarily by the natural stability of the soil and by the height and seasonal fluctuation of the water table. If the water table is high, laying a line for sewer, water, or gas in wet soils is difficult and frustrating because ditchbanks are likely to collapse. In some soils the banks are unstable even where the water table is not high.

The choice of a soil on which to locate a road or highway is affected primarily by the height and the fluctuation of the water table; by the hazard of flooding; by the stability of the soil materials, particularly under heavy load or pressure; and by the expected severity of frost action.

The choice of a soil for a pond or reservoir depends largely on the amount or rate of seepage that can be expected, particularly at the bottom of the reservoir. The amount of seepage depends on whether the reservoir floor consists of subsoil material or substratum material, for these layers may differ greatly in seepage characteristics. A constant and reliable source of water is desirable. Such a source is especially necessary if seepage or other losses are rapid.

Stability, erodibility, and the probable maximum density of soil material strongly affect the choice of a soil for building dikes, levees, dams, and other embankments. The maximum density to which soil material can be compacted affects the strength and permeability of the structure. All earth dams allow some seepage, but it is desirable to keep such water loss to a minimum. Soils in which the maximum density can be obtained by ordinary methods of compacting are those having a well-graded mixture of particle sizes and sufficient fine material to fill all voids between the particles when compacted.

The ease or difficulty with which a soil can be drained artificially is determined mainly by the least permeable layer or layers, by the height and fluctuation of the water table, by the erodibility of the bottom and banks of drainage ditches, and by the adequacy of outlets.

Soil features that affect the kind and design of an irrigation system are the rate that applied water can infiltrate the soil, the capacity of the soil to retain moisture, and the degree of natural drainage. Soils having a seasonal high water table need to be artificially drained before the irrigation system is installed.

In planning and designing terraces and diversions, the stability and erodibility of the surface soil are of special concern. These features, as well as the water-holding capacity and the natural fertility of the soil, strongly influence the design of waterways through fields and the kinds of grasses or other vegetation needed for sodding or stabilizing the waterways.

Two types of small ponds are common in this county —the excavated and the impounded. An excavated pond is one that is dug out of the natural terrain in an area

where the water table is high. Some soils, such as the Bayboro, are suitable for excavated small ponds under almost all conditions, for they have a high water table and are subject to only little loss through seepage because their subsoil and substratum are clayey.

The interpretations in table 7 are not a substitute for onsite investigation.

Use of Soils in Community Development

Wicomico County is still a rural area, but its population is growing and in recent years there has been an increase in residential and commercial uses of the land, especially in the Salisbury area and along some highways of the county. It is probable that the present trend will continue.

Accompanying the spread of residential and commercial developments is a growing need for information about soil conditions that affect nonfarm uses and recreational uses. The most common need is for information about the limitations of soils for disposing of sewage effluent from septic tanks. Less common are requests for data about the use of soils for building locations, earthmoving and landscaping, streets and parking lots, and the like.

Much of the information in this subsection is in tables 8 and 9. Table 8 gives limitations of all the soils in the county for selected nonfarm uses. In table 9 are soil limitations that affect specified recreational uses. In both tables the limitations of the soils are rated slight, moderate, or severe. If the limitations are rated moderate or severe, the chief limitation for the use specified is listed. A rating of *slight* indicates that the soil has few or no limitations and is considered desirable for the use named. A rating of *moderate* shows that a moderate problem is recognized but can be overcome or corrected. A rating of *severe* indicates that use of the soil is seriously limited by a hazard or restriction that is difficult to overcome. A rating of severe for a particular use does not imply that a soil so rated cannot be put to that use.

Any given property may not restrict all types of nonfarm uses or recreational uses equally. For example, slow permeability and impeded drainage that are only moderate limitations for many uses can severely limit the use of a soil in the disposal of sewage effluent from septic tanks.

Following are the properties that limit the soils of the county in their suitability for each nonfarm use specified in table 8:

Filter fields for sewage disposal: Permeability of the soil, depth to a seasonal high water table, natural drainage, depth to an impervious layer, slope, and hazard of flooding.

Sewage lagoons: Soil permeability, depth to an impervious layer, slope, hazard of flooding, and organic-matter content.

Homes with basements (two stories or less): Depth to water table, natural drainage, slope, and hazard of flooding. (The suitability of a soil for foundations should be investigated on the site.)

Streets and parking lots: Depth to water table, natural drainage, slope, soil stability, and hazard of flooding.

Sanitary land fills (trench method) and cemeteries: Depth to water table, natural drainage, depth to a hard layer, soil permeability, and hazard of flooding. Additional properties that affect the use of soils for cemeteries are the texture of the surface layer and the plasticity and stability of the layers underlying the surface layer.

Home gardens: Texture of the surface layer, permeability of the subsoil fertility, moisture-holding capacity, depth to water table, natural drainage, slope, and degree of erosion.

Another group of uses closely related to community development are those for outdoor recreation. Table 9 rates the soils of the county according to their limitations for various facilities of outdoor recreation that depend a great deal on soil properties. Among these facilities are campsites, including tent and trailer sites, where foot traffic and vehicular traffic are heavy and there is contiguous parking; athletic fields (baseball diamonds, football fields, volleyball courts) and other intensive play areas; parks, picnic areas, and play areas where foot traffic is usually not heavy; lawns, golf fairways, landscaping and related uses; and paths and trails for hiking, studying nature, or enjoying the scenery.

The major properties that limit the use of soils for recreational activities are wetness, natural drainage, depth to the water table, slope, texture and stability of the surface soil, degree of erosion, and soil permeability, which affects the ease or difficulty of improving drainage.

Not rated in the table is the suitability of the soils for service buildings and as filter fields for septic tanks. Soil features that limit the use of soils for washrooms, bathhouses, picnic shelters, and other service buildings, as well as seasonal and year-round cottages, are about the same as those that affect use for homesites. Wetness is less limiting, however, if the service building or cottage has no basement. Ratings for sewage disposal and homesites are given in table 8.

Formation, Morphology, and Classification of Soils

This section consists of four main parts. In the first part the factors of soil formation are discussed as they relate to the formation of soils in Wicomico County. The second part explains the interrelationships of soil series in the county. The third part discusses the morphology of soils in the county. In the fourth part each soil series represented in the county is placed in its respective family, subgroup, and order of the present system for classifying soils and also is placed in its respective great soil group and order of the 1938 classification system.

Factors of Soil Formation

Soils are the products of soil-forming processes acting upon materials altered or deposited by geologic forces. The five major factors in the formation of soils are climate, plant and animal life, parent material, relief, and time. Climate and plant and animal life, particularly vegetation, are the active forces in soil formation. Their effect on parent material is modified by relief and by the length

of time the parent material has been in place. The relative importance of each factor varies from place to place. In some places one factor is dominant and fixes most of the properties of the soil. Normally, however, the interaction of all five factors determines the kind of soil that develops in any given place.

Climate

Wicomico County has the humid, temperate climate that is typical of most coastal or near coastal areas of the Middle Atlantic States. Facts about the temperature and precipitation are given in table 12 in the section "General Nature of the County."

The climate is fairly uniform throughout the county. There are no significant differences in elevation and no obstructions to the movement of wind, clouds, and rainstorms. Masses of air generally move through the county from a northwesterly direction, but they are warmed by air that moves in periodically from the south and southwest.

Because precipitation exceeds evapotranspiration, this humid, temperate climate has caused the soils to be strongly leached. Most of the soluble materials that either were originally present or were released through weathering have been removed. Largely for this reason, the soils of the county are strongly acid and low in fertility.

Precipitation is mainly responsible for the subsoil that characterizes most soils in the county. In addition to leaching soluble minerals, water that percolates through the soil moves clay from the surface layer to a subsoil layer. Except for soils formed in recent alluvium or sand, soils of the county have a subsoil that contains more clay than the surface layer.

Also influenced by climate is the formation of blocky structure in the subsoil of well-developed soils. The development of aggregates (peds) in the subsoil is caused by changes in volume of the soil mass that are primarily the result of wetting and drying and of freezing and thawing.

Weathering of minerals occurs at a rate that is related to temperature and moisture supply. In Wicomico County the soils are relatively low in weatherable minerals. No free carbonates are in them, and most of the bases have been leached out. However, because the soils formed in transported parent materials that previously had undergone one or more cycles of erosion, these materials may have been highly weathered and leached at the time they were deposited.

Plant and animal life

Before the county was settled, the native vegetation had a major influence on the development of the soils. Although little is known about the effects of micro-organisms, earthworms, larvae, and other forms of animal life, the activities of these animals were important in the cycle of decay and regeneration of plants.

The settlers found a dense forest that consisted mainly of hardwoods. Oaks were the dominant trees in most parts of the county. Yellow-poplar, sweetgum, blackgum, holly, hickory, maple, dogwood, loblolly pine, pond pine, and Virginia pine also were important, but there probably were few pure stands of pine before the county was settled. The fairly pure stands of pine that exist today, particularly of loblolly pine, are generally in areas that were once cleared and cultivated.

Most hardwoods use large amounts of calcium and other bases if they are available. Soils that are normally high in bases remain so under a cover of deciduous trees because, in large part, the bases are returned to the soil each year. When the leaves fall and then decompose, the bases reenter the soil and are again used by plants.

The soils of Wicomico County, however, have never been very high in bases; consequently, they are acid even under a cover of hardwoods. Soils that are strongly acid and low in fertility are better suited to pines than to most hardwoods. Pines do not require large amounts of calcium and other bases, and their needles do little to restore fertility to the soil.

As agriculture developed in the county, man became an important factor in the development of the soils. The clearing of the forests, cultivation in some areas, introduction of new kinds of crops and other plants, and improvements in drainage have affected development of the soils and will affect their development in the future.

The most important changes brought about by man are (1) mixing the upper horizons of the soil to form a plow layer; (2) tilling sloping soils, which has resulted in accelerated erosion; and (3) liming and fertilizing to change the content of plant nutrients, especially in the upper horizons. Generally, the most obvious change in the vegetation has been the loss of the original plant cover, for most of the woodland has been cut over or is in second-growth stands. Also, there has been a notable increase in the number of pines as compared to the number of hardwoods.

Parent material

The parent material of the soils in this county consisted of sediments transported mainly by water, though part of it probably was transported by wind, and part by ice floes carried by glacial meltwater. Some of the sediments were the size of clay particles, but others were as large as pebbles. In places there were cobblestones and small to fairly large stones.

The stones and larger pebbles must have been transported by ice during the retreats of some of the last glaciers. The Eastern Shore of Maryland was not glaciated, but glaciers once extended into northern Pennsylvania. Fragments of ice containing clay, gravel, and a few stones must have floated down the rivers. As the ice floes drifted southward, they melted and dropped sediments in the shallow sea. The areas in which sediments were dropped later emerged from the sea to form the Delmarva Peninsula, of which Wicomico County is a part.

It is likely that the soil material in marshes and other low-lying areas consists of sediments that were recently deposited in shallow salt water. These sediments were elevated to sea level, either by slow uplift of the land or by fluctuations in the level of the sea and of Chesapeake Bay, or perhaps by both.

TABLE 8.—*Soil limitations*

Soil series and map symbol [1]	Sewage disposal	
	Filter fields	Lagoons
Bayboro (Ba, Bb)	Severe: high water table; very poor drainage.	Severe: too highly organic (slight if organic material is removed).
Beaches (Be)	Severe: tidal flooding [2]	Severe: tidal flooding; too permeable [2]
Downer:		
(DoA, DoB2)	Slight	Moderate: moderately permeable [3]
(DoC)	Slight	Severe: slopes
Elkton (Ea, Ek, Em, En)	Severe: high water table; poor drainage.	Slight
Evesboro:		
(EpB, EsB, EwB) (For properties of Galestown soils in mapping unit EwB, refer to the Galestown series.)	Slight [2]	Severe: too permeable [2]
(EyC) (For properties of Galestown and Downer soils in mapping unit EyC, refer to their respective series.)	Moderate: slope [2]	Severe: too permeable [2]
(EoD, ErD, EvD) (For properties of Galestown soils in mapping unit EvD, refer to the Galestown series.)	Severe: slope [2]	Severe: too permeable [2]
(EtF)	Severe: slope [2]	Severe: too permeable [2]
Fallsington (Fa, Fg, Fs)	Severe: high water table; poor drainage.	Moderate: moderately permeable [3]
Galestown:		
(GcB)	Slight [2]	Severe: too permeable [2]
(GaD)	Severe: slope [2]	Severe: too permeable [2]
Keyport:		
(KeA)	Severe: slow permeability; impeded drainage.	Slight
(KeB)	Severe: slow permeability; impeded drainage.	Moderate: slope
Klej (KsA, KsB)	Moderate: seasonal high water table.[2]	Severe: too permeable [2]
Leon (Le)	Severe: high water table; poor drainage.[2]	Severe: too permeable [2]
Matapeake:		
(MdA, MeA)	Moderate: restricted permeability	Moderate: moderate permeability [3]
(MdB2, MeB2)	Moderate: restricted permeability	Moderate: slope [3]
(MeC)	Moderate: restricted permeability	Severe: slope

See footnotes at end of table.

for selected nonfarm uses

Homes with basements (two stories or less)	Streets and parking lots	Sanitary land fills (trench method) and cemeteries	Home gardens
Severe: high water table; very poor drainage.	Severe: high water table; very poor drainage.	Severe: high water table	Severe: high water table; very poor drainage.
Severe: loose; poor stability; tidal flooding.	Severe: loose; poor stability; tidal flooding.	Severe for sanitary land fills (tidal flooding)[2]; severe for cemeteries (loose, poor stability, tidal flooding).	Very severe: droughtiness; salinity; flooding; very low fertility.
Slight	Slight [4]	Slight for sanitary land fills; moderate for cemeteries (loose, sandy).	Moderate: low available moisture capacity and fertility.
Slight	Slight for streets[4]; moderate for parking lots (slope).	Slight for sanitary land fills; moderate for cemeteries (loose, sandy).	Severe: slope.
Severe: high water table; poor drainage.	Severe: high water table; poor drainage.	Severe: high water table; poor drainage.	Severe: high water table; poor drainage.
Slight	Slight [4]	Slight for sanitary land fills; severe for cemeteries (loose, sandy).	Severe: low fertility; droughtiness.
Slight	Moderate for streets (slope) [5]; severe for parking lots (slope).	Moderate for sanitary land fills (slope); severe for cemeteries (loose, sandy, slope).	Severe: low fertility; droughtiness.
Moderate: slope [5]	Moderate for streets (slope) [3]; severe for parking lots (slope).	Severe: slope	Severe: low fertility; droughtiness; slope.
Severe: slope	Severe: slope	Severe: slope	Severe: low fertility; droughtiness; slope.
Severe: high water table; poor drainage.	Severe: high water table; poor drainage.	Severe: high water table; poor drainage.	Severe: high water table; poor drainage.
Slight	Slight [4]	Slight for sanitary land fills; severe for cemeteries (loose, sandy).	Severe: low fertility; droughtiness.
Moderate: slope [5]	Severe: slope	Severe: slope	Severe: low fertility; droughtiness; slope.
Moderate: water table; impeded drainage.	Moderate: seasonal wetness	Severe: slow permeability	Moderate: seasonal wetness.
Moderate: water table; impeded drainage.	Moderate: seasonal wetness	Severe: slow permeability	Moderate: seasonal wetness; slope.
Moderate: seasonal high water table.	Moderate: seasonal high water table.	Moderate: seasonal high water table.	Severe: seasonal wetness; slope.
Severe: high water table; poor drainage.	Severe: high water table; poor drainage.	Severe: high water table; poor drainage.	Severe: high water table; poor drainage; very low fertility.
Slight	Slight	Slight	Slight.
Slight	Slight [4]	Slight	Moderate: slope.
Slight	Slight for streets[4]; moderate for parking lots (slope).	Slight	Severe: slope.

TABLE 8.—*Soil limitations for*

Soil series and map symbol [1]	Sewage disposal	
	Filter fields	Lagoons
Matawan:		
(MfA, MmA, MnA)	Severe: high water table; impeded drainage.	Slight.
(MfB, MmB, MnB)	Severe: high water table; impeded drainage.	Moderate: slope.
(MmC)	Severe: high water table; impeded drainage.	Severe: slope.
(MmE)	Severe: high water table; impeded drainage; slope.	Severe: slope
Mattapex:		
(MpA, MtA)	Severe: restricted permeability; impeded drainage.	Slight [3].
(MpB, MtB)	Severe: restricted permeability; impeded drainage.	Moderate: slope [3].
Mixed alluvial land (Mv)	Severe: flood hazard.	Severe: flood hazard.
Muck (Mu)	Severe: very poor drainage; flood hazard.	Severe: too highly organic; flood hazard.
Norfolk:		
(NoA, NoB)	Slight.	Moderate: moderately permeable [3].
(NoC)	Slight: slope.	Severe: slope.
(NsD) (For properties of Sassafras soils in mapping unit NsD, refer to the Sassafras series.)	Moderate: slope.	Severe: slope.
(NsE) (For properties of Sassafras soils in mapping unit NsE, refer to the Sassafras series.)	Severe: slope.	Severe: slope.
Othello (Ot, Ow)	Severe: high water table; poor drainage.	Moderate: slow permeability [3].
Plummer (Pe)	Severe: high water table; poor drainage.	Severe: too permeable.
Pocomoke (Pk, Po)	Severe: high water table; very poor drainage.	Severe: too highly organic.
Portsmouth (Pr, Pt)	Severe: high water table; very poor drainage.	Severe: too highly organic.
Rutlege (Ru)	Severe: high water table; very poor drainage.	Severe: too permeable; too highly organic.
Sassafras:		
(SaA, SsA)	Slight.	Moderate: moderately permeable [3].
(SaB, SsB2)	Slight.	Moderate: moderately permeable; slope.[3]
(SsC2)	Slight.	Severe: slope.

See footnotes at end of table.

selected nonfarm uses—Continued

Homes with basements (two stories or less)	Streets and parking lots	Sanitary land fills (trench method) and cemeteries	Home gardens
Moderate: high water table; impeded drainage.	Moderate: seasonal wetness	Moderate: seasonal wetness	Moderate: seasonal wetness.
Moderate: high water table; impeded drainage.	Moderate: seasonal wetness	Moderate: seasonal wetness	Moderate: seasonal wetness; slope.
Moderate: high water table; impeded drainage.	Severe: seasonal wetness; slope	Moderate: seasonal wetness; slope.	Severe: seasonal wetness; slope.
Severe: high water table; impeded drainage; slope.	Severe: seasonal wetness; slope	Severe: seasonal wetness; slope	Severe: seasonal wetness; slope.
Moderate: water table; impeded drainage.	Moderate: seasonal wetness	Moderate: impeded drainage	Moderate: seasonal wetness.
Moderate: water table; impeded drainage.	Moderate: seasonal wetness	Moderate: impeded drainage	Moderate: seasonal wetness; slope.
Severe: flood hazard	Severe: flood hazard	Severe: flood hazard	Severe: flood hazard.
Severe: flood hazard; no stability.	Severe: flood hazard; no stability.	Severe: flood hazard; no stability; very poor drainage.	Severe: flood hazard.
Slight	Slight [4]	Slight for sanitary land fills; moderate for cemeteries (loose, sandy).	Moderate: low available moisture capacity and fertility.
Slight	Slight for streets [4]; moderate for parking lots (slope).	Slight for sanitary land fills; moderate for cemeteries (loose, sandy).	Severe: slope.
Moderate: slope	Moderate for streets (slope) [5]; severe for parking lots (slope).	Moderate for sanitary land fills (slope); moderate for cemeteries (loose, sandy, slope).	Severe: slope.
Severe: slope	Severe: slope	Severe: slope	Severe: slope.
Severe: high water table; poor drainage.	Severe: high water table; poor drainage.	Severe: high water table; poor drainage.	Severe: high water table; poor drainage.
Severe: high water table; poor drainage; loose.	Severe: high water table; poor drainage; loose.	Severe: high water table; poor drainage.	Severe: high water table; poor drainage; very low fertility.
Severe: high water table; very poor drainage.	Severe: high water table; very poor drainage.	Severe: high water table; very poor drainage.	Severe: high water table; very poor drainage.
Severe: high water table; very poor drainage.	Severe: high water table; very poor drainage.	Severe: high water table; very poor drainage.	Severe: high water table; very poor drainage.
Severe: high water table; very poor drainage.	Severe: high water table; very poor drainage.	Severe: high water table; very poor drainage.	Severe: high water table; very poor drainage.
Slight	Slight	Slight	Slight.
Slight	Slight [4]	Slight	Moderate: slope.
Slight	Slight for streets [4]; moderate for parking lots (slope).	Slight	Severe: slope.

TABLE 8.—*Soil limitations for*

Soil series and map symbol [1]	Sewage disposal	
	Filter fields	Lagoons
St. Johns (St, Su)	Severe: high water table; very poor drainage.[2]	Severe: too permeable; too highly organic.[2]
Swamp (Sw)	Severe: high water	Severe: high water
Tidal marsh (Tm)	Severe: tidal flooding	Severe: tidal flooding
Woodstown:		
(WfA, WoA, WsA)	Severe: high water table; impeded drainage.	Moderate: moderately permeable [3]
(WfB, WsB)	Severe: high water table; impeded drainage.	Moderate: moderately permeable; slope.[3]

[1] Not included in this table are Borrow pits (Bo) and Made land (Ma).
[2] Possibility of polluting nearby streams, springs, or shallow wells.
[3] Rating is for the subsoil; if the sandy substratum is exposed, the limitation is severe.

TABLE 9.—*Soil limitations for*

Soil series and map symbols [1]	Campsites (tents and trailers)	Athletic fields and other intensive play areas
Bayboro (Ba, Bb)	Severe: high water table; slow permeability.	Severe: high water table; slow permeability.
Beaches (Be)	Severe: loose sand; tidal flooding	Severe: loose sand; tidal flooding
Downer:		
(DoA)	Slight	Slight
(DoB2)	Slight for tents; moderate for trailers (slope).	Moderate: slope
(DoC)	Slight for tents; moderate for trailers (slope).	Severe: slope
Elkton (Ea, Ek, Em, En)	Severe: high water table; slow permeability.	Severe: high water table; slow permeability.
Evesboro:		
(EpB, EsB, EwB) (For properties of Galestown soils in mapping unit EwB, refer to the Galestown series.)	Moderate: sandy; slope	Moderate: sandy; slope
(EyC) (For properties of Galestown and Downer soils in mapping unit EyC, refer to their respective series.)	Moderate for tents (sandy; slope); severe for trailers (slope).	Severe: slope
(EoD, ErD, EvD) (For properties of Galestown soils in mapping unit EvD, refer to the Galestown series.)	Severe: slope	Severe: slope
(EtF)	Severe: slope	Severe: slope
Fallsington (Fa, Fg, Fs)	Severe: high water table	Severe: high water table
Galestown		
(GcB	Moderate: sandy; slope	Moderate: sandy; slope
(GaD)	Severe: slope	Severe: slope
Keyport (KeA, KeB)	Severe: slow permeability; seasonal high water table.	Severe: slow permeability; seasonal high water table.

See footnotes at end of table.

selected nonfarm uses—Continued

Homes with basements (two stories or less)	Streets and parking lots	Sanitary land fills (trench method) and cemeteries	Home gardens
Severe: high water table; very poor drainage.	Severe: high water table; very poor drainage.	Severe: high water table; very poor drainage.	Severe: high water table; very poor drainage.
Severe: high water	Severe: high water	Severe: high water	Severe: high water.
Severe: tidal flooding	Severe: tidal flooding	Severe: tidal flooding	Severe: tidal flooding.
Moderate: water table; impeded drainage.	Moderate: seasonal wetness	Moderate: seasonal wetness	Moderate: seasonal wetness.
Moderate: water table; impeded drainage.	Moderate: seasonal wetness	Moderate: seasonal wetness	Moderate: seasonal wetness; slope.

[4] For streets, the limitation is moderate in residential areas that are dense or rapidly expanding. Dense areas are defined as areas "in subdivisions," which means areas crisscrossed at short intervals by paved streets; street grades are kept to a minimum and individual lots generally are considerably less than 1 acre in size.
[5] For streets, the limitation is severe in residential areas that are dense or rapidly expanding. See the preceding footnote for definition of dense areas.

specified recreational uses

Parks, extensive play areas, and picnic areas	Lawns, golf fairways, and landscaping	Paths and trails
Severe: high water table	Severe: high water table	Severe: high water table; surface layer rich in organic matter.
Severe: loose sand; tidal flooding	Severe: loose sand; tidal flooding	Severe: loose sand; tidal flooding.
Slight	Moderate: sandy	Moderate: sandy.
Slight	Moderate: sandy	Moderate: sandy.
Slight	Moderate: sandy	Moderate: sandy.
Severe: high water table	Severe: high water table	Severe: high water table.
Moderate: sandy	Severe: sandy	Moderate: sandy.
Moderate: sandy; slope	Severe: sandy; slope	Moderate: sandy.
Severe: slope	Severe: slope	Moderate: sandy; slope.
Severe: slope	Severe: slope	Severe: slope.
Severe: high water table	Severe: high water table	Severe: high water table.
Moderate: sandy	Severe: sandy	Moderate: sandy.
Severe: slope	Severe: slope	Moderate: sandy; slope.
Slight	Moderate: seasonal wetness; impeded drainage.	Moderate: seasonal wetness; silt loam surface layer.

TABLE 9.—*Soil limitations for*

Soil series and map symbols [1]	Campsites (tents and trailers)	Athletic fields and other intensive play areas
Klej (KsA, KsB)	Moderate: seasonal high water table; sandy.	Moderate: sandy; slope.
Leon (Le)	Severe: high water table; sandy	Severe: high water table; sandy
Matapeake:		
(MdA)	Slight	Slight
(MdB2)	Slight for tents; moderate for trailers (slope).	Moderate: slope
(MeA)	Slight	Slight
(MeB2)	Slight for tents; moderate for trailers (slope).	Moderate: slope
(MeC)	Slight for tents; moderate for trailers (slope).	Severe: slope
Matawan:		
(MfA, MnA, MfB, MnB)	Moderate: seasonal high water table	Moderate: seasonal high water table
(MmA, MmB)	Moderate: seasonal high water table; sandy.	Moderate: sandy; slope
(MmC)	Moderate: seasonal high water table; sandy; slope.	Severe: slope
(MmE)	Severe: slope	Severe: slope
Mattapex:		
(MpA, MpB)	Moderate: restricted permeability; seasonal high water table.	Moderate: restricted permeability; seasonal high water table.
(MtA, MtB)	Moderate: restricted permeability; seasonal high water table.	Moderate: restricted permeability; seasonal high water table.
Mixed alluvial land (Mv)	Severe: flood hazard	Generally moderate [2]
Muck (Mu)	Severe: flood hazard; no stability	Severe: flood hazard; no stability
Norfolk:		
(NoA)	Slight	Slight
(NoB)	Slight for tents; moderate for trailers (slope).	Moderate: slope
(NoC)	Slight for tents; moderate for trailers (slope).	Severe: slope
(NsD)	Moderate for tents (slope); severe for trailers (slope).	Severe: slope
(NsE) (For properties of Sassafras soils in mapping units NsD and NsE, refer to the Sassafras series.)	Severe for tents (slope); severe for trailers (slope).	Severe: slope
Othello (Ot, Ow)	Severe: high water table	Severe: high water table
Plummer (Pe)	Severe: high water table	Severe: high water table
Pocomoke (Pk, Po)	Severe: high water table	Severe: high water table
Portsmouth (Pr, Pt)	Severe: high water table	Severe: high water table
Rutlege (Ru)	Severe: high water table	Severe: high water table
Sassafras:		
(SaA, SsA)	Slight	Slight
(SaB, SsB2)	Slight for tents; moderate for trailers (slope).	Moderate: slope
(SsC2)	Slight for tents; moderate for trailers (slope).	Severe: slope
St. Johns (St, Su)	Severe: high water table	Severe: high water table
Swamp (Sw)	Severe: high water	Severe: high water
Tidal marsh (Tm)	Severe: tidal flooding	Severe: tidal flooding
Woodstown (WfA, WfB, WoA, WsA, WsB)	Moderate: seasonal high water table	Moderate: seasonal high water table

[1] Not included in this table are Borrow pits (Bo) and Made land (Ma).

specified recreational uses—Continued

Parks, extensive play areas, and picnic areas	Lawns, golf fairways, and landscaping	Paths and trails
Moderate: seasonal high water table; sandy	Severe: sandy	Moderate: seasonal high water table; sandy.
Severe: high water table; sandy	Severe: high water table; sandy	Severe: high water table; sandy.
Slight	Slight	Slight.
Slight	Slight	Slight.
Slight	Slight	Moderate: silt loam surface layer.
Slight	Slight	Moderate: silt loam surface layer.
Slight	Slight	Moderate: silt loam surface layer.
Slight	Moderate: sandy	Moderate: seasonal high water table.
Moderate: seasonal high water table; sandy	Moderate: sandy	Moderate: seasonal high water table; sandy.
Moderate: seasonal high water table; sandy	Moderate: sandy	Moderate: seasonal high water table; sandy.
Severe: slope	Severe: slope	Severe: slope.
Slight	Slight	Moderate: seasonal high water table.
Slight	Slight	Moderate: seasonal high water table; silt loam surface layer.
Generally moderate [2]	Generally moderate [2]	Generally moderate.[2]
Severe: flood hazard; no stability	Severe: flood hazard; no stability	Severe: flood hazard; no stability.
Slight	Slight	Moderate: sandy.
Slight	Slight	Moderate: sandy.
Slight	Slight	Moderate: sandy.
Moderate: slope	Moderate: slope	Moderate: sandy.
Severe: slope	Severe: slope	Severe: slope.
Severe: high water table	Severe: high water table	Severe: high water table.
Severe: high water table	Severe: high water table	Severe: high water table.
Severe: high water table	Severe: high water table	Severe: high water table.
Severe: high water table	Severe: high water table	Severe: high water table.
Severe: high water table	Severe: high water table	Severe: high water table.
Slight	Slight	Slight.
Slight	Slight	Slight.
Slight	Slight	Slight.
Severe: high water table	Severe: high water table	Severe: high water table.
Severe: high water	Severe: high water	Severe: high water.
Severe: tidal flooding	Severe: tidal flooding	Severe: tidal flooding.
Slight	Slight	Moderate: seasonal high water table.

[2] Mixed alluvial land has variable features that limit use, but in most places it is wet, poorly drained, moderately slow in permeability, and flooded at unpredictable intervals. An onsite examination is needed to determine the degree and kind of limitations that affect use.

The texture of the soils is directly related to the texture of the parent material. Soils of the Evesboro, Galestown, Klej, Leon, Plummer, Rutlege, and St. Johns series, for example, developed in coarse-textured materials consisting chiefly of silica sand and partly of clay and, in some places, silt. There is some evidence, however, that their parent material, particularly that of the Evesboro and Galestown soils, was reworked by wind or by water, or both, between the time it was deposited and the time required for the soils to develop. The Evesboro soils occur on formations that appear to be old wind-worked dunes. The Galestown soils lie, in part, on old alluvial terraces along major streams of the county, notably adjacent to the eastern bank of the Nanticoke River.

Over the largest part of the county, the sediments making up the parent material of the soils consist mainly of sand, but there is a significant amount of silt or clay, or both. In places these materials are stratified and are of differing texture in alternate layers. Soils of the Fallsington, Matawan, Norfolk, Pocomoke, Sassafras, and Woodstown series developed in this kind of material.

The Matapeake, Mattapex, Othello, and Portsmouth soils developed in a mantle of silt. This material appears to be loess that probably was blown from glaciated areas to the north. In places where the mantle was 36 to 40 inches thick and occurred unconformably on sandy materials, the soils that developed are of the Matapeake, Mattapex, Othello, and Portsmouth series.

The finest textured sediments consisted chiefly of clay and silty clay but partly of fine and very fine sand. Soils of the Bayboro, Elkton, and Keyport series developed in this kind of sediment.

In Wicomico County there also are several kinds of sediments that have been deposited recently. Mixed alluvial land, a miscellaneous land type, consists of variable alluvium; Tidal marsh is made up of recently deposited sediments, mostly clay, that have been influenced by salt water and the action of tides; Beaches are water-deposited and wave-worked sands; Muck is decomposed organic material; and Swamp consists of unclassified sediments that are permanently waterlogged.

More than one kind of soil commonly develops in the same general kind of parent material. Thus, it is evident that factors other than parent material have influenced the kinds of soils that have developed in the county.

Relief

Wicomico County is entirely within the Atlantic Coastal Plain. Most of the county is undulating or gently sloping, but some rather large areas are nearly level, a considerable acreage is fairly strongly sloping, and small areas are steep or very steep. Most slopes are smooth, though some are complex and hummocky and are marked by many small sinks or depressions. Slopes generally range between 2 and 5 percent, but in many places they are as much as 15 percent and in a few areas are 30 percent or more. The steeper areas generally are breaks above drainageways. They occupy less than 0.1 percent of the county.

Local differences in elevation normally are only a few feet. In several areas, however, there are differences of as much as 60 feet to the mile. The highest elevations are in the central part of the county; the highest point, near Parsonsburg, is 85 feet above sea level.

The county slopes mainly toward the Nanticoke River to the west, but part of it slopes toward the Pocomoke River to the east. Marshes in the county are approximately at sea level.

The undulating relief contributes to the moderately good or good drainage in the Downer, Matapeake, Woodstown, and some other soils. In the more nearly level areas, however, water moves slowly through the soils and increases the problem of drainage. These soils are the Bayboro, Leon, Pocomoke, and other poorly drained or very poorly drained soils.

Time

Geologically, the deposits of soil materials in the county range from very young to fairly old. The most recent, or Holocene, deposits are those on alluvial flood plains and in marshy areas affected by tides. In such areas soil material is still being added from year to year when the areas are flooded. Somewhat older, geologically, are the sands and the silty deposits of loess, which are probably of Pleistocene age. Most of the deposits in the county are probably of Miocene age, but some may be of Pliocene age (*5, 7*).

Time accounts for many of the differences among soils. Some of the alluvial material in the county has not been in place long enough for well-defined horizons to form. Mixed alluvial land is made up of material of this kind. On the other hand, the Downer, Fallsington, and Mattapex soils are examples of nearly level or gently sloping soils that show definite and, presumably, mature development. They occur in areas where there has been little or no geologic erosion and where the products of the soil-forming processes have remained in place as components of genetic soils.

Interrelationships of the Soils

In table 10 the soils of the county are grouped to show relationships in position, parent material, and drainage. Most of the soils are on uplands or terraces, but some are on flood plains or bottom lands. The texture of the parent material varies widely. Many of the soils are poorly drained or very poorly drained.

Soils of the uplands and terraces.—Although the soils on uplands and on terraces are in two different topographic positions, this difference does not affect the use and suitability of the soils and, in itself, does not affect the classification and naming of soils. Soils of some series, such as the Galestown and Sassafras, are on both uplands and terraces.

The soils on uplands have developed in place from the underlying parent material. Those on terraces have developed in very old material, generally sand, that was deposited by streams. The soils on uplands and terraces occupy about 90 percent of the county.

Soils of the flood plains or bottom lands.—The flood plains or bottom lands consist partly of areas where soil material has been deposited only recently when streams overflowed their banks. Also in low-lying positions are areas of deep muck. These soil materials have not been classified by soil series but are named Mixed alluvial land and Muck. They are still subject to flooding or ponding. Some areas are flooded only occasionally, and some are flooded every year or several times a year. The material

TABLE 10.—*Soils arranged to show relationships in position, parent material, and drainage*

SOILS OF UPLANDS AND TERRACES

Parent material	Excessively drained	Well drained	Moderately well drained	Poorly drained	Very poorly drained
Sand and loamy sand	Evesboro Galestown		Klej	Plummer	Rutlege.
Sand, mainly quartz				Leon	St. Johns.
Sand, silt, and clay		Downer Norfolk Sassafras	Woodstown	Fallsington	Pocomoke.
Sand over sandy clay			Matawan	Elkton [1]	Portsmouth.
Thin mantle of silt [2] over sand		Matapeake	Mattapex	Othello	Portsmouth.
Clay or silty clay			Keyport	Elkton	Bayboro.

SOILS OF FLOOD PLAINS OR BOTTOM LANDS

Parent material	Excessively drained	Well drained	Moderately well drained	Poorly drained	Very poorly drained
Organic sediments					Muck.
Mineral sediments				Mixed alluvial land.	

[1] Sand generally is not more than 6 to 8 inches thick. [2] Mantle of silt generally is no thicker than 36 to 40 inches.

in the deposits is commonly of several different textures, but in many places the texture is uniform. The soil material does not show much development of a surface layer, and there is no B horizon.

Soils of the flood plains are not extensive in this county. They make up about 4 percent of the total acreage. The remaining 6 percent of the county, other than the acreage occupied by uplands and terraces, consists of Tidal marsh, Swamp, and Beaches. These areas are not included in this subsection, because they do not have a developed soil profile.

Morphology of Soils

In most soils of the county, morphology is expressed by evident horizons. Little horizon differentiation is evident, however, in young alluvial soils and in soils that consist chiefly of sand or loamy sand.

The differentiation of horizons in the soils is the result of one or more of the following processes: (1) Accumulation of organic matter, (2) leaching of carbonates and of salts more soluble than calcium carbonate, (3) chemical weathering, chiefly by hydrolysis, of the primary minerals of the parent material into silicate clay minerals, (4) translocation of the silicate clay minerals, and probably of some silt-sized particles, from one horizon to another, and (5) chemical changes (oxidation, reduction, and hydration) and transfer of iron.

In almost all soils of the county, several of these processes have been active in the development of horizons. For example, the interaction of the first, second, third, and fourth processes is reflected in the strongly expressed horizons of the Sassafras soils, and all five processes have been active in the development of the moderately well drained Keyport and Woodstown soils. Only the first and fifth processes have had any marked effect on the Leon, Rutlege, and St. Johns soils. In most soils, however, the second process, the leaching of carbonates and salts, must have taken place in the soil materials before they were deposited, and some of the other processes may have been active.

Some organic matter has accumulated in all the soils to form an A1 horizon. Through tillage, however, the material in this horizon commonly has been mixed with materials from some of the underlying horizons. The A1 horizon has thus lost its identity and become part of an Ap horizon, or plow layer. The content of organic matter varies in the different soils and ranges from very low to very high. The Evesboro and Galestown soils all have a weak A1 horizon that contains little organic matter. Bayboro, Pocomoke, Portsmouth, and St. Johns soils have a prominent A1 horizon in which there is more than 15 percent organic matter in places.

There have been few detailed studies of the clay mineralogy of the soils of the Eastern Shore of Maryland. In such soils as the Sassafras and some of the other better oxidized soils, kaolinite is probably one of the chief clay minerals.

The translocation of silicate clay minerals has contributed strongly to development of horizons in many of the soils. Silicate clay minerals have been partly removed from the A1 and A2 horizons and partly immobilized in the Bt horizon. This is characteristic of the Bayboro, Downer, Elkton, Fallsington, Galestown, Keyport, Matapeake, Matawan, Mattapex, Norfolk, Othello, Pocomoke, Portsmouth, Sassafras, and Woodstown soils. To a slight degree, it also is characteristic of the Klej and some other soils that do not have a distinct textural B horizon.

The reduction and transfer of iron has occurred to some degree in all the soils that have impeded drainage. In the areas of naturally wet soils in Wicomico County, this process, known as gleying, has been of great importance. It has particularly affected the Bayboro, Elkton, Fallsington, Othello, Plummer, Pocomoke, and Portsmouth soils.

Iron that has been reduced in areas where the soil is poorly aerated generally becomes mobile and may be removed from the soil entirely. In the soils of this county, however, iron has moved either within the horizon where it originated or to another horizon nearby. Part of this iron may become reoxidized and segregated to form the yellowish-brown, strong-brown, or yellowish-red mottles

that indicate impeded drainage and are common in a gleyed horizon.

When silicate clay forms from primary minerals, some iron generally is freed as hydrated oxide. Depending on the degree of hydration, these oxides are more or less red. Even a small amount of the oxide will cause the subsoil to have a reddish color. Iron oxides color the subsoil, even where there has not been enough accumulation of clay minerals to form a textural, or Bt, horizon. This is characteristic of the Evesboro soils.

A profile that is representative for each soil series in the county is described in the section "Descriptions of the Soils."

Classification of Soils

Soils are classified so that we can more easily remember their significant characteristics. Classification enables us to assemble knowledge about the soils, to see their relationships to one another and to the whole environment, and to develop principles that help us in understanding their behavior and their response to manipulation. First through classification and then through use of soil maps, we can apply our knowledge of soils to specific fields and other tracts of land.

Thus in classification, soils are placed in narrow categories that are used in detailed soil surveys so that knowledge about the soils can be organized and used in managing farms, fields, and woodland; in developing rural areas; in engineering work; and in many other ways. Soils are placed in broad classes to facilitate study and comparison in large areas, such as countries and continents.

Two systems of classifying soils have been used in the United States in recent years. The older system was adopted in 1938 (*2*) and later revised (*8*). The system currently used was adopted for general use by the National Cooperative Soil Survey in 1965. The current system is under continual study. Therefore, readers interested in developments of the current system should read the latest literature available (*6*, *11*).

In table 11, the soil series of Wicomico County are placed in some categories of the current system and in the great soil groups and orders of the older system. Placement of some soil series in the current system of classification may change as more precise information becomes available.

The current system of classification has six categories. Beginning with the broadest, these categories are order, suborder, great group, subgroup, family, and series. In this system the criteria used as a basis for classification are soil properties that are observable and measurable. The properties are chosen, however, so that the soils of similar genesis, or mode of origin, are grouped together. The classes that make up the current system are briefly defined in the following paragraphs.

ORDER: Ten soil orders are recognized. Each order is named with a word of three or four syllables ending in *sol* (Ent-i-sol). The ten orders are Entisols, Vertisols, Inceptisols, Aridisols, Mollisols, Spodosols, Alfisols, Ultisols, Oxisols, and Histosols. The properties used to differentiate the soil orders are those that tend to give broad climatic groupings of soils. Two exceptions, Entisols and Histosols, occur in many different climates.

TABLE 11.—*Soil series classified according to the present system of classification and the 1938 system with its later revisions*

Series	Present classification			1938 classification	
	Family	Subgroup	Order	Great soil group	Order
Bayboro	Clayey, mixed, thermic	Typic Umbraquults	Ultisols	Humic Gley soils	Intrazonal soils.
Downer	Coarse-loamy, siliceous, mesic	Typic Hapludults	Ultisols	Gray-Brown Podzolic soils.	Zonal soils.
Elkton	Clayey, mixed, mesic	Typic Ochraquults	Ultisols	Low-Humic Gley soils	Intrazonal soils.
Evesboro	Mesic, coated	Typic Quarzipsamments	Entisols	Regosols	Azonal soils.
Fallsington	Fine-loamy, mixed, mesic	Typic Ochraquults	Ultisols	Low-Humic Gley soils	Intrazonal soils.
Galestown	Sandy, siliceous, mesic	Psammentic Hapludults	Ultisols	Sols Bruns Acides	Intrazonal soils.
Keyport	Clayey, mixed, mesic	Aquic Hapludults	Ultisols	Red-Yellow Podzolic soils	Zonal soils.
Klej	Mesic, coated	Aquic Quarzipsamments	Entisols	Regosols	Azonal soils.
Leon	Sandy, siliceous, thermic	Aeric Haplaquods	Spodosols	Ground-Water Podzols	Intrazonal soils.
Matapeake	Fine-silty, mixed, mesic	Typic Hapludults	Ultisols	Gray-Brown Podzolic soils.	Zonal soils.
Matawan	Fine-loamy, mixed, mesic	Aquic Hapludults	Ultisols	Gray-Brown Podzolic soils.	Zonal soils.
Mattapex	Fine-silty, mixed, mesic	Aquic Hapludults	Ultisols	Gray-Brown Podozolic soils.	Zonal soils.
Norfolk	Fine-loamy, siliceous, thermic	Typic Paleudults	Ultisols	Red-Yellow Podzolic soils.	Zonal soils.
Othello	Fine-silty, mixed, mesic	Typic Ochraquults	Ultisols	Low-Humic Gley soils	Intrazonal soils.
Plummer	Loamy, siliceous, thermic	Grossarenic Ochraquults	Ultisols	Regosols	Azonal soils.
Pocomoke	Fine-loamy, mixed, thermic	Typic Umbraquults	Ultisols	Humic Gley soils	Intrazonal soils.
Portsmouth	Fine-loamy, mixed, thermic	Typic Umbraquults	Ultisols	Humic Gley soils	Intrazonal soils.
Rutlege	Sandy, siliceous, thermic	Typic Humaquepts	Inceptisols	Humic Gley soils	Intrazonal soils.
St. Johns	Sandy, siliceous, hyperthermic.	Typic Haplaquods	Spodosols	Ground-Water Podzols	Intrazonal soils.
Sassafras	Fine-loamy, mixed, mesic	Typic Hapludults	Ultisols	Gray-Brown Podzolic soils.	Zonal soils.
Woodstown	Fine-loamy, siliceous, mesic	Aquic Hapludults	Ultisols	Gray-Brown Podzolic soils.	Zonal soils.

Table 11 shows the four soil orders in Wicomico County—Entisols, Inceptisols, Spodosols, and Ultisols. Entisols are mineral soils that have been only slightly modified from the geologic material in which they have been formed. In Wicomico County the principal modification is a weakly developed A1 horizon.

Inceptisols are mineral soils in which horizons have started to develop. They generally occur on young but not recent land surfaces. At the current stage of their development, these soils are not yet in equilibrium with their environment. Their name is derived from the Latin *inceptum*, for beginning.

Spodosols are mineral soils that have horizons in which organic colloids, or iron and aluminum compounds, or both, have accumulated; or they may have thin horizons cemented by iron overlying a fragipan. The name is derived from the Greek *spodos*, meaning wood ash.

Ultisols are mineral soils that have a clay-enriched B horizon in which base saturation is low, generally less than 35 percent. Their name is derived from the Latin *ultimus*, or last.

SUBORDER: Each order is divided into suborders, primarily on the basis of those soil characteristics that seem to produce classes having the greatest genetic similarity. The suborders narrow the broad climatic range permitted in the orders. The soil properties used to separate suborders mainly reflect either the presence or absence of waterlogging or soil differences resulting from the climate or vegetation. Names of suborders have two syllables. The last syllable indicates the order. An example is Aquepts (*Aqu*, meaning water or wet, and ept, from Inceptisol). The suborder is not shown in table 11.

GREAT GROUP: Soil suborders are separated into great groups on the basis of uniformity in the kinds and sequence of major soil horizons and features. The horizons used to make separations are those in which clay, iron, or humus has accumulated or those that have pans interfering with growth of roots or movement of water. The features used are the self-mulching properties of clays, major differences in chemical composition (mainly calcium, magnesium, sodiums, and potassium), and the like.

The names of great groups have three or four syllables and are made by adding a prefix to the name of the suborder. An example is Humaquept (*Hum*, for the presence of humus, *aqu*, for wetness or water, and *ept*, from Inceptisol). The great group is not shown separately in table 11, because the name of the great group is the last word in the name of the subgroup.

SUBGROUP: Great groups are divided into subgroups, one representing the central (typic) segment of the group and others, called intergrades, that have properties of one great group and also one or more properties of another great group, subgroup, or order. Subgroups may also be made in those instances where soil properties intergrade outside of the range of any other great group, subgroup, or order. The names of subgroups are derived by placing one or more adjectives before the name of the great group. An example is Typic Humaquept (a typical Humaquept).

FAMILY: Families are separated within a subgroup primarily on the basis of properties important to the growth of plants or behavior of soils where used for engineering. Among the properties considered are texture, mineralogy, reaction, soil temperature, permeability, thickness of horizons, and consistence. A family name consists of a series of adjectives, and these are the class names for texture, mineralogy, and so on, that are used as family differentiae.

SERIES: The series consists of a group of soils that formed from a particular kind of parent material and have genetic horizons that, except for texture of the surface soil, are similar in differentiating characteristics and in arrangement in the profile. Among these characteristics are color, structure, reaction, consistence, and mineralogical and chemical composition.

General Nature of the County

This section gives information about the geology, relief, and drainage of the county. It also describes the climate and discusses history, population, agriculture, and other subjects of general interest.

Geology, Relief, and Drainage

Wicomico County lies in the physiographic province called the Atlantic Coastal Plain and is about 80 miles east of the fall line that separates the plain from the Piedmont Plateau. The county is underlain by sediments about 1 mile thick consisting mainly of gravel, silt, clay, sand, and shells and shell fragments. Beneath the sediments is crystalline rock that dips to the southeast about 90 feet in a mile. Similarly, most of the overlying sediments dip to the southeast at a rate ranging from 10 to 95 feet per mile. The sediments were deposited mainly in a marine or shallow-water environment, and this accounts for their dominantly gray or white color.

The county is part of a low, eroded plain where the differences in elevation are slight. Although it appears monotonously level to the untrained eye, it actually includes terraces, stream channels, drowned valleys, basinlike depressions, remnant dunes, swamps, and marshes. The terraces were laid down by meltwater from the continental ice mass; they are evidence that the level of the sea was higher in recent geologic time than it is today.

Along the Nanticoke and Wicomico Rivers, there are tidal marshes that lie at or near sea level. Most of the eastern and much of the central and southwestern parts of the county are level to gently rolling. Some of these areas, however, are marked by many swales and ridges that give them a hummocky appearance. In places the swales contain basins surrounded by low rims; these are called whale wallows, Carolina bays, or Maryland basins. The soils in the basins are deeper, have a higher content of organic matter, and are darker colored than the soils on the rims. Large areas in the eastern, central, and southwestern parts of the county lie only a few feet above the normal level of the streams, and in places the soils in these areas grade into marshland. The highest areas of the county are in the northwestern part and in some of the central part, where the relief is gently rolling.

Dunes occur at nearly all elevations in the county. Some dunes lie at an elevation of 10 to 20 feet along the east side of the Nanticoke River, and others are as high as 85 feet above sea level in the vicinity of Parsonsburg. Various kinds of material make up these dunes. The ones along the Nanticoke River are mostly sand, but those at elevations of 45 to 70 feet consist of silt and clay that are capped with

sand. One of the later dunes is Spring Hill, northeast of Hebron.

The streams of the county are fairly well established, but their flow is rather sluggish and, during wet periods, causes flooding in some low-lying areas. All of the county is drained by streams that flow into the Chesapeake Bay. Areas lying east of the north-south line through Parsonsburg are drained by the Pocomoke River and its tributaries. Surface water from the central part of the county and the city of Salisbury flows southwestward into the Wicomico River. West of a line extending from Nanticoke through Hebron to the Delaware line, the county is drained by the Nanticoke River and its tributaries.

Water Supply

Wicomico County has abundant ground water available for development (*4*). Generally, the depth to the water table is less than 25 feet and is within the limit of lift by suction pumps. In 1955, it was estimated that more than 260 million gallons of water a day was available from water-bearing beds within the uppermost 500 feet in Wicomico, Somerset, and Worcester Counties. The rate of water use during the period 1950–53 was only about 5 percent of the total quantity available. Other aquifers, or water-bearing beds, occur at greater depths, but these remain practically unexplored.

In Wicomico County the water is obtained mostly from sediments of the Pleistocene and Pliocene series, though some water is derived from the Pocomoke, Manokin, and Nanticoke aquifers in the Miocene series.

Relief has an important effect on the retention and infiltration of rainfall, the retardation of runoff, and the discharge of ground water through evapotranspiration. Most of the ground water comes from precipitation that filters through the soil or seeps in from streams, lakes, or ponds that recharge the ground-water reservoirs. The percentage of precipitation that recharges the ground water is highest in winter and is lowest late in summer and early in fall. During the growing season, much of the rainfall is used by plants and then returned to the atmosphere, but in winter the plants are mainly dormant and the rainfall becomes ground water. About 51 percent of the total rainfall enters the soil, and the rest runs off. About 61 percent of the annual rainfall is lost through evapotranspiration.

The principal aquifer for the city of Salisbury is red gravelly sand that is of Pliocene age and is 43 to 66 feet thick. Tests of this aquifer show transmissibility of 100,000 gallons of water per foot of thickness. A potential source of much additional water occurs just north of Salisbury.

TABLE 12.—*Temperature and*

[Elevation

Month	Temperature									Precipitation		
	Average			Extremes				Two years in 10, month will have at least 4 days with—		Average	Greatest daily	Year
	Daily maximum	Daily minimum	Monthly	Highest on record	Year	Lowest on record	Year	Maximum temperature equal to or higher than—	Minimum temperature equal to or lower than—			
	°F.	°F.	°F.	°F.		°F.		°F.	°F.	Inches	Inches	
January	48.0	29.3	38.7	75	[2] 1943	−9	1918	66	15	3.66	2.80	1948
February	49.6	29.1	39.4	80	1930	−6	1934	66	17	3.21	2.55	1920
March	56.3	34.8	45.6	93	1907	1	1911	76	22	4.13	2.80	1939
April	67.2	44.0	55.6	96	1915	15	1923	84	33	3.34	3.65	1954
May	76.9	53.4	65.2	98	1911	28	1913	88	40	3.62	3.40	1948
June	84.4	62.4	73.4	102	1925	38	1938	94	50	3.49	2.51	1948
July	87.6	67.0	77.3	106	1930	48	[2] 1952	96	58	4.39	4.00	1938
August	86.4	65.8	76.1	106	1918	45	1949	93	55	6.01	8.90	1936
September	80.7	58.9	69.8	100	1932	35	[2] 1956	89	45	4.44	7.50	1935
October	70.5	48.0	59.3	92	1939	25	[2] 1940	83	35	3.50	3.90	1910
November	60.2	38.4	49.3	86	1950	10	[2] 1930	74	26	3.21	2.42	1937
December	49.3	29.9	39.6	75	[2] 1929	−4	1958	65	15	3.13	2.15	1922
Year	68.1	46.8	57.5	106	[2] 1930	−9	1918			46.13	8.90	1936

[1] Averages for the period 1931–60 (Aug. 1941 through Sept. 1942 missing. Extremes for the period 1906–63 (Aug. 1941 through Sept. 1942 missing).

[2] Also in earlier years.

Here, the buried channel of an ancient river, called the Naylor Mill paleochannel, contains highly permeable sand and gravel that extend to a depth of about 230 feet.

Climate [4]

Wicomico County has a humid, continental climate, modified by nearness to large bodies of water. The general flow of atmospheric air is from west to east, but alternating high and low pressure systems dominate or control the climate during the colder half of the year. High pressure systems normally bring westerly to northwesterly winds, cooler temperatures, and clearing weather. Low pressure systems bring southerly and easterly winds, warmer temperatures, cloudiness, and rain or snow according to the season and the temperature. This pattern tends to break down in summer, however, as warm moist air spreads northward from the south and southwest and remains over the area much of the time.

The Atlantic Ocean and the Chesapeake Bay modify masses of air that pass over them before reaching the county. In winter the temperature rises when easterly winds, associated with a low pressure system, bring air from off the ocean. In summer, winds from the east lower the temperature, and so does air flowing inland from the bay.

Wicomico County is on the Coastal Plain of Maryland, where the relief is level to gently rolling. The elevation is mostly less than 40 feet above sea level, but it ranges from sea level in the tidelands along the Chesapeake Bay to approximately 85 feet near Parsonsburg. Hence, the climate varies little throughout the county, and the data given for Salisbury in table 12 is representative for this area.

The average annual temperature at Salisbury is approximately 57° F. The hottest period of the year is the last half of July, when the maximum temperature in the afternoon averages near 90°. A temperature exceeding 100° occurs infrequently. The highest temperature recorded at Salisbury was 106° on August 7, 1918, and July 21, 1930. The coldest period of the year is the latter part of January and the early part of February, when the minimum temperature in early morning averages near 26°. During an average winter, a freezing temperature of 32° or lower can be expected on about 90 days. A temperature of 0° or lower is rare. The lowest temperature recorded at Salisbury was —9° on January 21, 1918.

[4] By W. J. MOYER, State climatologist, Weather Bureau, Environmental Science Services Administration, U.S. Department of Commerce.

precipitation at Salisbury, Md.[1]

10 feet]

Precipitation—Continued: One year in 10, month will have—: Less than—	Precipitation—Continued: One year in 10, month will have—: More than—	Snow, sleet: Average	Snow, sleet: Maximum monthly	Snow, sleet: Year	Snow, sleet: Greatest daily	Snow, sleet: Year	Average number of days with—: Precipitation of 0.10 inch or more	Temperature: Maximum: 90° and above	Temperature: Maximum: 32° and below	Temperature: Minimum: 32° and below	Temperature: Minimum: 0° and below
Inches	*Inches*	*Inches*	*Inches*		*Inches*						
1.7	6.7	3.5	32.0	1940	16.0	1940	8	0	2	21	0
1.4	4.8	3.2	18.5	1914	15.0	1936	7	0	1	19	0
2.0	7.1	2.7	21.5	1914	12.0	1914	8	0	0	14	0
1.8	5.7	.1	10.0	1915	10.0	1915	7	0	0	4	0
.8	8.0	0	0	--------	0	--------	7	1	0	(3)	0
1.0	6.1	0	0	--------	0	--------	6	7	0	0	0
1.8	7.7	0	0	--------	0	--------	7	11	0	0	0
2.3	11.0	0	0	--------	0	--------	7	8	0	0	0
1.2	8.8	0	0	--------	0	--------	6	3	0	0	0
1.4	6.2	0	(4)	1910	(4)	1910	5	(3)	0	2	0
1.1	5.1	.3	6.0	[2] 1938	6.0	1912	6	0	0	10	0
1.3	5.5	2.6	17.0	1935	11.0	1928	6	0	1	20	0
36.4	56.0	12.4	32.0	1940	16.0	1940	----------	30	4	90	0

[3] Less than one-half day.
[4] Trace, an amount too small to be measured.

Table 13 shows the probability of freezing temperatures at Salisbury on or after given dates in spring and on or before given dates in fall. The average growing season, or frost-free period, in the central part of the county is 191 days; it extends from the middle of April to the end of October. In other parts of the county, the average growing season differs somewhat. It is 210 to 220 days in tideland areas near the Chesapeake Bay and is 180 to 190 days in the eastern part of the county.

The annual precipitation at Salisbury averages about 46 inches, but extremes range from 22 inches in 1930 to 73 inches in 1948. Generally, precipitation is fairly evenly distributed throughout the year. It ranges from 3 to 4 inches per month from October through June and is slightly more than 4 inches in July and September. Only in August is the average monthly amount as high as 6 inches.

The precipitation may be heavy in any one month, but it varies more in summer. During an intense one-day thunderstorm that began in August 29, 1936, a rainfall of 8.90 inches was recorded at Salisbury. In summer, rainfall occurs mostly in showers and thunderstorms, and these may bring heavy rain to one area and only a sprinkle to another. As a result, the amount of moisture stored in the soil in summer commonly varies markedly within short distances. In winter, precipitation usually occurs in general storms that cover large areas and may last for several days.

Minor or local floods can be expected every year or so along the streams in the county. Although flooding can occur in any month, it is most frequent late in winter and in spring. Severe thunderstorms in summer occasionally cause flash flooding. On an average, rainfall of 2¾ inches in one hour can be expected once in 10 years, and rainfall of 3¾ inches in one hour can be expected once in 100 years.

Drought may occur at any time of year, but a serious drought affecting farm crops is most likely in summer. Generally, the rainfall and the moisture stored in the soil are adequate for the favorable growth or crops. At times, however, showers are unevenly distributed in summer, dry periods occur at critical stages of plant growth, and the rate of evaporation is high.

The average annual snowfall at Salisbury is 12.4 inches, but the annual total varies greatly from year to year. Only a trace of snow fell in the winters of 1948–49 and 1955–56, whereas 40 inches of snow was measured in 1913–14. The greatest one-day snowfall, which occurred on January 8, 1940, was 16 inches. The greatest depth of snow on the ground at any one time was 21 inches, recorded on January 30, 1966.

Thunderstorms occur on an average of 32 days a year, and two-thirds of these storms are in June, July, and August. Occasionally, crops are damaged by lightning, wind, hail, or flooding. Hail falls during these storms only once or twice a year, usually in the period from May through August.

Tornadoes are rare and have caused little damage. The effects of tropical storms or hurricanes are felt in the county about once a year, usually in August or September. Most of these storms cause only minor damage in Wicomico County, and the rainfall that accompanies them is beneficial.

The prevailing wind is from the west to northwest, except in summer, when the prevailing wind is southerly. The average wind velocity is 8 to 10 miles per hour, but winds of 50 to 60 miles per hour sometimes accompany hurricanes, severe thunderstorms in summer, or general storms in winter.

The relative humidity generally is lowest in February, March, and April and is highest in July, August, and September. The humidity varies during the day and, as a rule, decreases with increasing temperature. On a normal day the highest relative humidity occurs about sunrise; at this hour it is about 85 percent late in summer and early in fall and is about 75 percent late in winter and early in spring. In the afternoon, humidity generally ranges from

TABLE 13.—*Probable dates of last specified freezing temperatures in spring and first in fall*

[Data from Salisbury, Wicomico County, Md.]

Probability	Dates for given probability and temperature		
	32° or lower	24° or lower	16° or lower
Spring:			
9 years in 10 later than	April 3	February 25	January 26
3 years in 4 later than	April 10	March 5	February 6
2 years in 3 later than	April 13	March 8	February 10
1 year in 2 later than	April 18	March 14	February 17
1 year in 3 later than	April 23	March 20	February 24
1 year in 4 later than	April 26	March 23	February 28
1 year in 10 later than	May 3	March 31	March 11
Fall:			
1 year in 10 earlier than	October 13	November 11	November 28
1 year in 4 earlier than	October 19	November 17	December 5
1 year in 3 earlier than	October 22	November 20	December 7
1 year in 2 earlier than	October 26	Novemper 24	December 12
2 years in 3 earlier than	October 30	November 28	December 17
3 years in 4 earlier than	November 2	December 1	December 19
9 years in 10 earlier than	November 8	December 7	December 26

50 to 55 percent in summer and is about 60 percent in winter. Heavy fog occurs on about 35 days of each year.

Normally, the county receives sunshine about 60 percent of the maximum time possible, but the range is from 55 percent in winter to 65 percent in summer.

History and Population

Settlement of the area that is now Wicomico County began in the middle of the 17th century. Some of the settlers came from England and Scotland, but others, including religious refugees, were from Virginia. Settlement was mainly along the banks of rivers, where soils were well drained and water was easily accessible for travel and transportation. The county was not organized until 1867; it was formed from the northern part of Somerset County and the northwestern part of Worcester County. The name Wicomico came from two Indian words meaning house and building. It apparently referred to an Indian town on the banks of the river having the same name.

Salisbury, the county seat, was founded in 1732 and is one of the oldest cities in Maryland. In 1960 the county had a population of 49,050, more than half of which lived in or near Salisbury. The population of the county has nearly doubled since 1920.

Industry

Many of the industries in Wicomico County are closely related to agriculture and to the natural resources of the area. There are canneries, packinghouses for truck crops and seafood, and facilities for processing poultry. In addition, the county has large plants that manufacture poultry feed from corn and soybeans grown in the area.

Lumbering is an important industry in the county. Among the products that provide income from this source are lumber, baskets for fruits and vegetables, other types of millwork, creosoted wood products, and pleasure boats.

Seafood is obtained from the navigable waterways in and near the county, and there are facilities for marketing fresh fish, oysters, clams, and crabs, as well as for processing canned and frozen seafood.

Garment manufacturing is a major activity, and so is the harvesting and processing of fruits, truck crops, and nursery stock. The county also has a fertilizer plant and many outlets for farm machinery.

Transportation and Markets

In colonial days transportation was mainly by water. As recently as 1920, steamboat service was provided between Salisbury and nearby points. Small tankers, as well as carriers of grain and other cargo, still use the docking facilities at Salisbury. A pulpwood company has a loading dock at Sharptown.

The county is served by the Baltimore and Eastern and the Penn Central Railroads and by modern highways that cross the county in nearly all directions. U.S. Highway No. 50 crosses in an east-west direction, and U.S. 13 extends north and south. Most of the other roads are hard surfaced. Thus, Wicomico County is readily accessible to markets in Wilmington, Philadelphia, New York, Washington, Baltimore, and Norfolk. Flights are scheduled daily between the Salisbury airport and Washington.

Agriculture

Agriculture in Wicomico County is favored by a temperate climate, a fairly long growing season, well-distributed rainfall, and responsive soils. About 54 percent of the total acreage was in farms in 1960. About 71,966 acres were used as cropland, 2,085 acres were in pasture, and 57,312 acres were in woodlots and other farm uses. According to the Maryland Department of Forests and Parks, the county had 113,400 acres of forest in 1965.

In the following paragraphs is information about farms in the county, crops grown, and poultry and livestock raised. The statistics are from the U.S. Bureau of the Census and the "Comparative Census of Maryland Agriculture by Counties" (*3*).

Farms in the county have decreased in number but have increased in size. In 1959 there were 1,418 farms in the county, a decrease of nearly 20 percent since 1950 and of 61 percent since 1900. The size of the average farm increased to 92.6 acres in 1959.

Broiler production is the main farm enterprise. In 1964, the broilers sold amounted to 37,965,393, and other chickens amounted to 74,069. In addition, 41,373 turkeys were raised.

Livestock and dairy products brought little income to farmers in 1964. At that time there were only four dairy herds and about 8,000 hogs reported in the county. Only a few farms were used entirely for raising both poultry and livestock.

Corn and soybeans are the principal crops. They are used chiefly as feed for poultry, but some of the grain is harvested in the field by hogs. In 1964, corn was grown on about 24,000 acres, and soybeans on about 32,000 acres. The acreage of corn has increased since 1959 but has decreased since 1900. The average yields per acre of corn almost doubled in the period 1959–64. Table 14 gives the acreage of the most important crops grown in the county and the number of fruit trees.

TABLE 14.—*Acreage of principal crops and number of fruit trees in 1964*

Crop	Unit
	Acres
Corn harvested for grain	23, 590
Barley	2, 354
Rye	2, 087
Soybeans	31, 971
Vegetables harvested for sale	6, 177
Irish potatoes	265
Sweetpotatoes	2, 154
Snap beans	962
Tomatoes	328
Cucumbers	659
Lima beans	189
Other	1, 620
Strawberries	83
	Number [1]
Peach trees	17, 746
Apple trees	8, 534

[1] Trees producing in 1959.

Before the Revolutionary War, corn and tobacco were the important crops grown in the area that is now Wicomico County. By the 1920's, corn had declined in importance and truck crops were an important source of farm income. Today, the broiler industry has shifted the emphasis back to corn and also is using soybeans harvested from a large acreage. The only other crop grown for grain is rye, but most of the rye planted in the county is used as a cover crop in fields where the soils are subject to blowing. Truck crops continue to be a major source of income.

Most farms in the county were operated by owners or part-owners in 1959, but 10.4 percent were operated by tenants. Most of the tenants rented the farms they operated. Only a few of them farmed on a share basis.

In this county mechanized equipment is a much more important source of power than horses and mules. In 1959, there were only 557 horses and mules in the entire county.

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Glossary

Acidity, soil. See Reaction, soil.

Aeration, soil. The exchange of air in soil with air from the atmosphere; but that in a poorly aerated soil is considerably higher in carbon dioxide and lower in oxygen.

Aggregate, soil. Many fine particles held in a single mass or cluster, such as a clod, crumb, block, or a prism.

Alluvium. Soil material, such as sand, silt, or clay, that has been deposited on land by streams.

Available moisture capacity. The difference between the amount of water in a soil at field capacity and the amount in the same soil at the permanent wilting point. Commonly expressed as inches of water per inch depth of soil.

Base. Any of the positive, generally metallic elements or combinations of elements that make up the nonacid plant nutrients. The most important of these in plant nutrition are calcium (Ca), potassium (K), magnesium (Mg), and ammonium (NH_4).

Chroma. See Color, Munsell notation.

Clay. As a soil separate, the mineral soil particles less than 0.002 millimeter in diameter. As a soil textural class, soil material that is 40 percent or more clay, less than 45 percent sand, and less than 40 percent silt.

Color, Munsell notation. A system for designating color by degrees of three simple variables—hue, value, and chroma. For example, the color notation 10YR 6/4 stands for a color with hue of 10YR, a value of 6, and a chroma of 4. Hue is the dominant spectral color; value relates to the relative lightness or darkness of color; and chroma is the relative purity or strength of color and increases as grayness decreases.

Consistence, soil. The feel of the soil and the ease with which a lump can be crushed by the fingers. Terms commonly used to describe consistence are—

Loose.—Noncoherent; will not hold together in a mass.

Friable.—When moist, soil crushes easily under gentle pressure between thumb and forefinger and can be pressed together into a lump.

Firm.—When moist, soil crushes under moderate pressure between thumb and forefinger, but resistance is distinctly noticeable.

Plastic.—When wet, soil is readily deformed by moderate pressure but can be pressed into a lump; will form a "wire" when rolled between thumb and forefinger.

Sticky.—When wet, soil adheres to other material and tends to stretch somewhat and pull apart, rather than to pull free from other material.

Hard.—When dry, soil is moderately resistant to pressure; can be broken with difficulty between thumb and forefinger.

Soft.—When dry, soil breaks into powder or individual grains under very slight pressure.

Cemented.—Hard and brittle; little affected by moistening.

Contour farming. Plowing, cultivating, planting, and harvesting in rows that are at right angles to the natural direction of the slopes or that are parallel to terrace grade.

Cover crop. A close-growing crop grown primarily to improve and to protect the soil between periods of regular crop production; or a crop grown between trees and vines in orchards and vineyards.

Diversion. A ridge of earth, generally a terrace, that is built to divert runoff from its natural course and, thus, to protect areas downslope from the effects of such runoff.

Drainage. As a farm management operation, the removal of excess water from the soil. As a soil condition, the relative rapidity and extent of the removal of water from the soil, under natural conditions.

Flood plain. Nearly level land, consisting of stream sediments, that borders a stream and is subject to flooding unless protected artificially.

Fragipan. A loamy, brittle, subsurface horizon that is very low in organic matter and clay but is rich in silt or very fine sand. The layer is seemingly cemented when dry, has a hard or very hard consistence, and has a high bulk density in comparison with the horizon or horizons above it. When moist, the fragipan tends to rupture suddenly if pressure is applied, rather than to deform slowly. The layer is generally mottled, is slowly or very slowly permeable to water, and has few or many bleached fracture planes that form polygons. Fragipans are a few inches to several feet thick; they generally occur below the B horizon, 15 to 40 inches below the surface.

Gleization, or gleying. The reduction, translocation, and segregation of soil compounds, notably of iron, usually in the subsoil or substratum, as a result of poor aeration and drainage; expressed in the soil by mottled colors dominated by gray. The soil-forming processes leading to the development of a gley soil.

Green-manure crop. A crop grown for the purpose of being turned under in an early stage of maturity or soon after maturity for soil improvement.

Horizon, soil. A layer of soil, approximately parallel to the surface, that has distinct characteristics produced by soil-forming processes. These are the major horizons.

O horizon.—The layer of organic matter on the surface of a mineral soil. This layer consists of decaying plant residues.

A horizon.—The mineral horizon at the surface or just below an O horizon. This horizon is the one in which living organisms are most active, and it is therefore marked by the accumulation of humus. The horizon may have lost one or more of soluble salts, clay, and sesquioxides (iron and aluminum oxides).

B horizon.—The mineral horizon below an A horizon. The B horizon is in part a layer of change from the overlying A to the underlying C horizon. The B horizon also has distinctive characteristics caused by (1) accumulation of clay, sesquioxides, humus, or some combination of these; (2) prismatic or blocky structure; (3) redder or stronger colors than the A horizon; or (4) some combination of these. The combined A and B horizons are generally called the solum, or true soil. If a soil lacks a B horizon, the A horizon alone is the solum.

C horizon.—The weathered rock material immediately beneath the solum. This layer is commonly called the soil parent material and is presumed to be like that from which the overlying horizons were formed in most soils. If the underlying material is known to be different from that in the solum, a Roman numeral precedes the letter C.

R layer.—Consolidated rock beneath the soil. The rock generally underlies a C horizon but may be immediately beneath the A or B horizon.

Hue. See Color, Munsell notation.

Internal soil drainage. The downward movement of water through the soil profile. The rate of movement is determined by the texture, structure, and other characteristics of the soil profile and underlying layers, and by the height of the water table, either permanent or perched. Relative terms for expressing internal drainage are *none, very slow, slow, medium, rapid,* and *very rapid.*

Leaching. The removal of soluble material from soils or other material by percolating water.

Marine deposit. Material deposited in the waters of oceans and seas and exposed by the elevation of the land or the lowering of the water level.

Morphology, soil. The makeup of the soil, including the texture, structure, consistence, color, and other physical, chemical, mineralogical, and biological properties of the various horizons that make up the soil profile.

Mottled. Irregularly marked with spots of different colors that vary in number and size. Mottling in soils generally indicates poor aeration and lack of adequate drainage. Descriptive terms are as follows: Abundance—*few, common,* and *many*; size—*fine, medium,* and *coarse;* and contrast—*faint, distinct,* and *prominent.*

Natural drainage. Refers to the conditions that existed during the development of the soil, as opposed to altered drainage, which is commonly the result of artificial drainage or irrigation but may be caused by the sudden deepening of channels or the blocking of drainage outlets. Seven different classes of natural drainage are recognized.

Excessively drained soils are commonly very porous and rapidly permeable and have a low water-holding capacity.

Somewhat excessively drained soils also are very permeable and are free from mottling throughout their profile.

Well-drained soils are nearly free from mottling and are commonly of intermediate texture.

Moderately well drained soils commonly have a slowly permeable layer in or immediately beneath the solum. They have uniform color in the A and upper B horizons and have mottling in the lower B and the C horizons.

Somewhat poorly drained soils are wet for significant periods but not all the time, and in some soils mottles are common below 6 to 16 inches in the lower A horizon and in the B and C horizons.

Poorly drained soils are wet for long periods and are light gray and generally mottled from the surface downward, although mottling may be absent or nearly so in some soils.

Very poorly drained soils are wet nearly all the time. They have a dark-gray or black surface layer and are gray or light gray, with or without mottling, in the deeper parts of the profile.

Nutrient, plant. Any element taken in by a plant, essential to its growth and used by it in the production of food and tissue. Nitrogen, phosphorus, potassium, calcium, magnesium, sulfur, iron, manganese, copper, boron, zinc, and perhaps other elements obtained from the soil and carbon, hydrogen, and oxygen obtained largely from the air and water are plant nutrients.

Parent material. The weathered rock or partly weathered soil material from which soil has formed; the C horizon.

Permeability, soil. The quality of a soil horizon that enables water or air to move through it. Terms used to describe permeability are as follows: *Very slow, slow, moderately slow, moderate, moderately rapid, rapid,* and *very rapid.*

pH value. A numerical means for designating acidity and alkalinity in soils and other biological systems. See Reaction, soil.

Profile, soil. A vertical section of the soil through all its horizons and extending into the parent material. See Horizon, soil.

Reaction, soil. The degree of acidity or alkalinity of a soil, expressed in pH values or in words as follows:

	pH		pH
Extremely acid	Below 4.5	Neutral	6.6 to 7.3
Very strongly acid	4.5 to 5.0	Mildly alkaline	7.4 to 7.8
Strongly acid	5.1 to 5.5	Moderately alkaline	7.9 to 8.4
Medium acid	5.6 to 6.0	Strongly alkaline	8.5 to 9.0
Slightly acid	6.1 to 6.5	Very strongly alkaline.	9.1 and higher

Relief. The elevations or inequalities of a land surface, considered collectively.

Sand. Individual rock or mineral fragments in soils having diameters ranging from 0.05 to 2.0 millimeters. Most sand grains consist of quartz, but they may be of any mineral composition. The textural class name of any soil that contains 85 percent or more sand and not more than 10 percent clay.

Silt. Individual mineral particles in a soil that range in diameter from the upper limit of clay (0.002 millimeter) to the lower limit of very fine sand (0.05 millimeter). Soil of the silt textural class is 80 percent or more silt and less than 12 percent clay.

Soil. A natural, three-dimensional body on the earth's surface that supports plants and that has properties resulting from the integrated effect of climate and living matter acting upon parent material, as conditioned by relief over periods of time.

Solum. The upper part of a soil profile, above the parent material, in which the processes of soil formation are active. The solum in mature soil includes the A and B horizons. Generally, the characteristics of the material in these horizons are unlike those of the underlying parent material. The living roots and other plant and animal life characteristic of the soil are largely confined to the solum.

Structure, soil. The arrangement of primary soil particles into compound particles or clusters that are separated from adjoining aggregates and have properties unlike those of an equal mass of unaggregated primary soil particles. The principal forms of soil structure are—*platy* (laminated), *prismatic* (vertical axis of aggregates longer than horizontal), *columnar* (prisms with rounded tops), *blocky* (angular or subangular), and *granular.* Structureless soils are (1) *single grain* (each grain by itself, as in dune sand) or (2) *massive* (the particles adhering together without any regular cleavage, as in many claypans and hardpans).

Subsoil. Technically, the B horizon; roughly, the part of the profile below plow depth.

Substratum. Any layer lying beneath the solum, or true soil; the C or R horizon.

Surface soil. The soil ordinarily moved in tillage, or its equivalent in uncultivated soil, about 5 to 8 inches in thickness. The plowed layer.

Texture, soil. The relative proportions of sand, silt, and clay particles in a mass of soil. The basic textural classes, in order of increasing proportions of fine particles are as follows: *Sand, loamy sand, sandy loam, loam, silt loam, silt, sandy clay loam, clay loam, silty clay loam, sandy clay, silty clay,* and *clay.* The sand, loamy sand, and sandy loam classes may be further divided by specifying "coarse," "fine," or "very fine."

Tilth, soil. The condition of the soil in relation to the growth of

plants, especially soil structure. Good tilth refers to the friable state and is associated with high noncapillary porosity and stable, granular structure. A soil in poor tilth is nonfriable, hard, nonaggregated, and difficult to till.

Topography. See Relief.

Topsoil. A presumed fertile soil or soil material, ordinarily rich in organic matter, used to topdress roadbanks, lawns, and gardens.

Upland (geologic). Land consisting of material unworked by water in recent geologic time and lying, in general, at a higher elevation than the alluvial plain or stream terrace. Land above the lowlands along rivers.

Value. See Color, Munsell notation.

Water table. The highest part of the soil or underlying rock material that is wholly saturated with water. In some places an upper, or perched, water table may be separated from a lower one by a dry zone.

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U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE
MARYLAND AGRICULTURAL EXPERIMENT STATION

GENERAL SOIL MAP
WICOMICO COUNTY, MARYLAND

SCALE IN MILES
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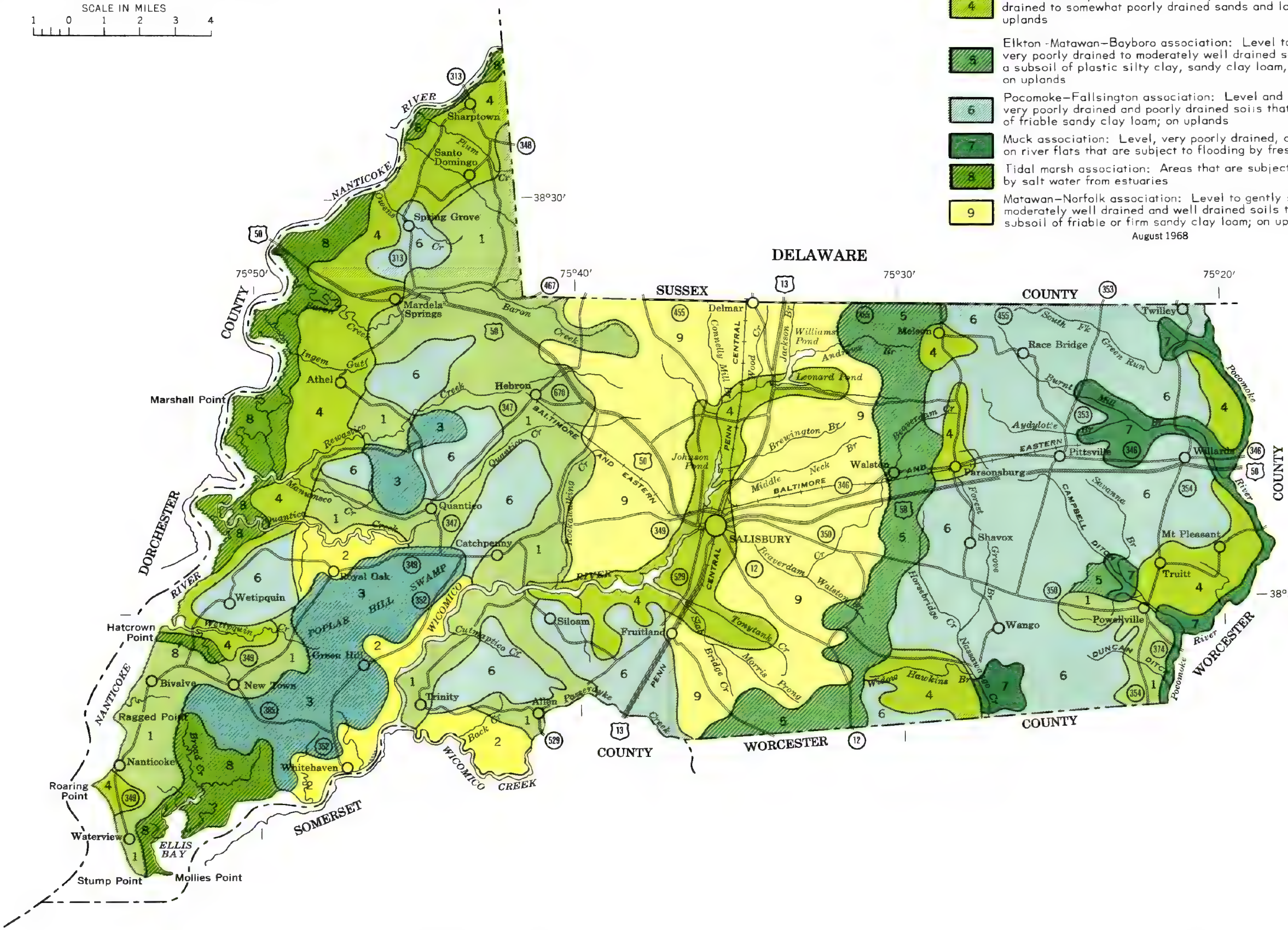


SOIL ASSOCIATIONS

1 Fallsington–Woodstown–Sassafras association: Level to rolling, poorly drained to well-drained soils that have a subsoil of friable sandy clay loam; on uplands

2 Matapeake–Mattapex–Othello association: Level to sloping, well-drained to poorly drained soils that have a subsoil mainly of firm silty clay loam or silt loam; on uplands

3 Othello–Fallsington–Portsmouth association: Level and nearly level, poorly drained and very poorly drained soils that have a subsoil mainly of friable or firm sandy clay loam or silty clay loam; on uplands

4 Evesboro–Klej association: Nearly level to steep, excessively drained to somewhat poorly drained sands and loamy sands; on uplands

5 Elkton-Matawan–Bayboro association: Level to gently sloping, very poorly drained to moderately well drained soils that have a subsoil of plastic silty clay, sandy clay loam, or sandy clay; on uplands

6 Pocomoke–Fallsington association: Level and nearly level, very poorly drained and poorly drained soils that have a subsoil of friable sandy clay loam; on uplands

7 Muck association: Level, very poorly drained, organic soils on river flats that are subject to flooding by fresh water

8 Tidal marsh association: Areas that are subject to flooding by salt water from estuaries

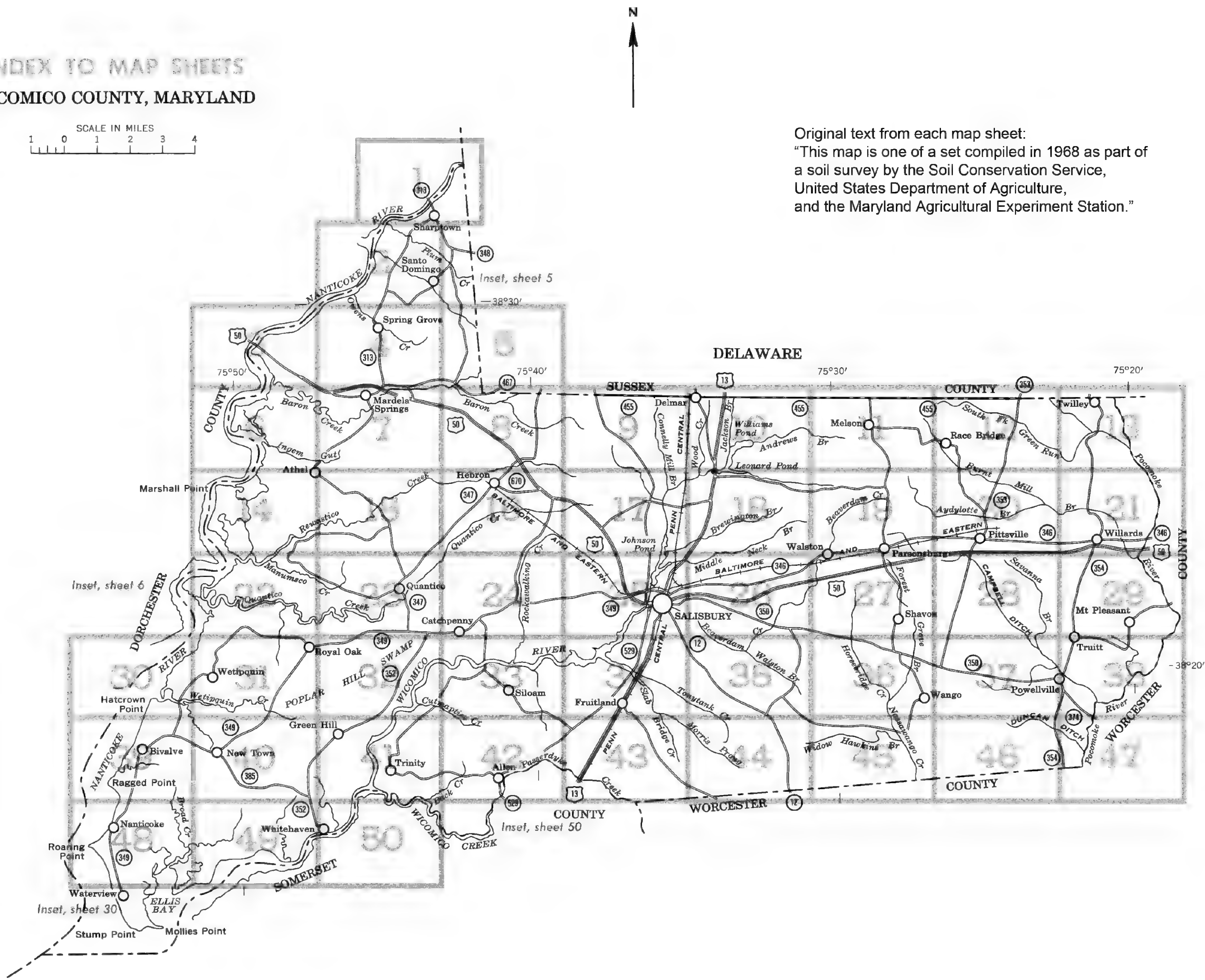
9 Matawan–Norfolk association: Level to gently sloping, moderately well drained and well drained soils that have a subsoil of friable or firm sandy clay loam; on uplands

August 1968

INDEX TO MAP SHEETS

WICOMICO COUNTY, MARYLAND

Original text from each map sheet:
"This map is one of a set compiled in 1968 as part of
a soil survey by the Soil Conservation Service,
United States Department of Agriculture,
and the Maryland Agricultural Experiment Station."



SOIL LEGEND

The first capital letter is the initial one of the soil name. A second capital letter, A, B, C, D, E, or F, shows the slope. Most symbols without a slope letter are those of nearly level soils or land types, but some are for soils or land types that have a considerable range in slope. Soils that are named as moderately eroded have a final number, 2, in their symbol.

SYMBOL	NAME
Ba	Bayboro loam
Bb	Bayboro silt loam
Be	Beaches
Bo	Borrow pits
DoA	Downer loamy sand, 0 to 2 percent slopes
DoB2	Downer loamy sand, 2 to 5 percent slopes, moderately eroded
DoC	Downer loamy sand, 5 to 10 percent slopes
Ea	Elkton loam
Ek	Elkton sandy loam
Em	Elkton silt loam
En	Elkton silty clay loam
EoD	Evesboro loamy sand, 5 to 15 percent slopes
EpB	Evesboro loamy sand, clayey substratum, 0 to 5 percent slopes
ErD	Evesboro sand, 5 to 15 percent slopes
EsB	Evesboro sand, clayey substratum, 0 to 5 percent slopes
EtF	Evesboro soils, 15 to 40 percent slopes
EvD	Evesboro–Galestown sands, 5 to 15 percent slopes
EwB	Evesboro–Galestown sands, clayey substratum, 0 to 5 percent slopes
EyC	Evesboro–Galestown–Downer loamy sands, 0 to 10 percent slopes
Fa	Fallsington fine sandy loam
Fg	Fallsington loam
Fs	Fallsington sandy loam
GaD	Galestown loamy sand, 5 to 15 percent slopes
GcB	Galestown loamy sand, clayey substratum, 0 to 5 percent slopes
KeA	Keyport silt loam, 0 to 2 percent slopes
KeB	Keyport silt loam, 2 to 5 percent slopes
KsA	Klej loamy sand, 0 to 2 percent slopes
KsB	Klej loamy sand, 2 to 5 percent slopes
Le	Leon loamy sand
Ma	Made land
MdA	Matapeake fine sandy loam, 0 to 2 percent slopes
MdB2	Matapeake fine sandy loam, 2 to 5 percent slopes, moderately eroded
MeA	Matapeake silt loam, 0 to 2 percent slopes
MeB2	Matapeake silt loam, 2 to 5 percent slopes, moderately eroded
MeC	Matapeake silt loam, 5 to 10 percent slopes
MfA	Matawan fine sandy loam, 0 to 2 percent slopes
MfB	Matawan fine sandy loam, 2 to 5 percent slopes
MmA	Matawan loamy sand, 0 to 2 percent slopes
MmB	Matawan loamy sand, 2 to 5 percent slopes
MmC	Matawan loamy sand, 5 to 10 percent slopes
MmE	Matawan loamy sand, 10 to 30 percent slopes
MnA	Matawan sandy loam, 0 to 2 percent slopes
MnB	Matawan sandy loam, 2 to 5 percent slopes
MpA	Mattapex loam, 0 to 2 percent slopes
MpB	Mattapex loam, 2 to 5 percent slopes
MtA	Mattapex silt loam, 0 to 2 percent slopes
MtB	Mattapex silt loam, 2 to 5 percent slopes
Mu	Muck
Mv	Mixed alluvial land
NoA	Norfolk loamy sand, 0 to 2 percent slopes
NoB	Norfolk loamy sand, 2 to 5 percent slopes
NoC	Norfolk loamy sand, 5 to 10 percent slopes
NsD	Norfolk and Sassafras soils, 10 to 15 percent slopes
NsE	Norfolk and Sassafras soils, 15 to 30 percent slopes
Ot	Othello silt loam
Ow	Othello silt loam, low
Pe	Plummer loamy sand
Pk	Pocomoke loam
Po	Pocomoke sandy loam
Pr	Portsmouth sandy loam
Pt	Portsmouth silt loam
Ru	Rutlege loamy sand
SaA	Sassafras fine sandy loam, 0 to 2 percent slopes
SaB	Sassafras fine sandy loam, 2 to 5 percent slopes
SsA	Sassafras sandy loam, 0 to 2 percent slopes
SsB2	Sassafras sandy loam, 2 to 5 percent slopes, moderately eroded
SsC2	Sassafras sandy loam, 5 to 10 percent slopes, moderately eroded
St	St. Johns loamy sand
Su	St. Johns mucky loamy sand
Sw	Swamp
Tm	Tidal marsh
WfA	Woodstown fine sandy loam, 0 to 2 percent slopes
WfB	Woodstown fine sandy loam, 2 to 5 percent slopes
WoA	Woodstown loam, 0 to 2 percent slopes
WsA	Woodstown sandy loam, 0 to 2 percent slopes
WsB	Woodstown sandy loam, 2 to 5 percent slopes

CONVENTIONAL SIGNS

WORKS AND STRUCTURES

Highways and roads
- Dual
- Good motor
- Poor motor
- Trail

Highway markers
- National Interstate
- U. S.
- State or county

Railroads
- Single track
- Multiple track
- Abandoned

Bridges and crossings
- Road
- Trail, foot
- Railroad
- Ferry (FY)
- Ford (FORD)
- Grade
- R. R. over
- R. R. under
- Tunnel

Buildings
- School
- Church
- Station

Mines and Quarries

Station, forest fire or lookout

Pits, gravel or other

Power line

Pipeline

Cemetery

Dams

Levee

Tanks

Well, oil or gas

BOUNDARIES

- National or state
- County
- Reservation
- Land grant
- Small park, cemetery, airport

DRAINAGE

Streams, double-line
- Perennial
- Intermittent

Streams, single-line
- Perennial
- Intermittent
  - Crossable with tillage implements
  - Not crossable with tillage implements
  - Unclassified

Canals and ditches (CANAL)

Lakes and ponds
- Perennial (water, w)
- Intermittent

Wells, water (flowing)

Spring

Marsh or swamp

Wet spot

Alluvial fan

Drainage end

RELIEF

Escarpments
- Bedrock
- Other

Prominent peak

Depressions (Large, Small)
- Crossable with tillage implements
- Not crossable with tillage implements
- Contains water most of the time

SOIL SURVEY DATA

- Soil boundary and symbol (Dx)
- Gravel
- Stony, very stony
- Rock outcrops
- Chert fragments
- Clay spot
- Sand spot
- Gumbo or scabby spot
- Made land
- Severely eroded spot
- Blowout, wind erosion
- Gully

Soil map constructed 1968 by Cartographic Division, Soil Conservation Service, USDA, from 1964 aerial photographs. Controlled mosaic based on Maryland plane coordinate system, Lambert conformal conic projection, 1927 North American datum.

GUIDE TO MAPPING UNITS

For a full description of a mapping unit, read both the description of the mapping unit and the soil series to which the mapping unit belongs. Other information is given in tables as follows:

Acreage and extent of soils, table 1, p. 9.
Estimated average yields, table 2, p. 40.
Suitability of soils for wildlife, table 4, p. 48.
Information on engineering, tables 5, 6, and 7, pp. 50 through 69.
Limitations for nonfarm use, table 8, p. 72.

Map symbol	Mapping unit	Described on page	Capability unit Symbol	Capability unit Page	Woodland suitability group Number	Woodland suitability group Page
Ba	Bayboro loam	10	IIIw-9	35	1	42
Bb	Bayboro silt loam	10	IIIw-9	35	1	42
Be	Beaches	11	VIIIs-2	37	20	45
Bo	Borrow pits	11	VIIIs-4	37	21	45
DoA	Downer loamy sand, 0 to 2 percent slopes	12	IIs-4	34	7	44
DoB2	Downer loamy sand, 2 to 5 percent slopes, moderately eroded	12	IIs-4	34	7	44
DoC	Downer loamy sand, 5 to 10 percent slopes	12	IIIe-33	35	8	44
Ea	Elkton loam	13	IIIw-9	35	1	42
Ek	Elkton sandy loam	13	IIIw-11	36	1	42
Em	Elkton silt loam	13	IIIw-9	35	1	42
En	Elkton silty clay loam	13	VIw-2	37	10	44
EoD	Evesboro loamy sand, 5 to 15 percent slopes	14	VIIs-1	37	5	43
EpB	Evesboro loamy sand, clayey substratum, 0 to 5 percent slopes	14	IIIs-1	36	5	43
ErD	Evesboro sand, 5 to 15 percent slopes	14	VIIs-1	37	5	43
EsB	Evesboro sand, clayey substratum, 0 to 5 percent slopes	14	IVs-1	36	5	43
EtF	Evesboro soils, 15 to 40 percent slopes	14	VIIs-1	37	6	43
EvD	Evesboro-Galestown sands, 5 to 15 percent slopes	14	VIIs-1	37	5	43
EwB	Evesboro-Galestown sands, clayey substratum, 0 to 5 percent slopes	14	IVs-1	36	5	43
EyC	Evesboro-Galestown-Downer loamy sands, 0 to 10 percent slopes	14	IIIs-1	36	5	43
Fa	Fallsington fine sandy loam	15	IIIw-6	35	1	42
Fg	Fallsington loam	15	IIIw-7	35	1	42
Fs	Fallsington sandy loam	16	IIIw-6	35	1	42
GaD	Galestown loamy sand, 5 to 15 percent slopes	16	VIIs-1	37	5	43
GcB	Galestown loamy sand, clayey substratum, 0 to 5 percent slopes	17	IIIs-1	36	5	43
KeA	Keyport silt loam, 0 to 2 percent slopes	17	IIw-8	34	11	44
KeB	Keyport silt loam, 2 to 5 percent slopes	18	IIe-13	33	11	44
KsA	Klej loamy sand, 0 to 2 percent slopes	18	IIIw-10	36	3	43
KsB	Klej loamy sand, 2 to 5 percent slopes	19	IIIw-10	36	3	43
Le	Leon loamy sand	19	Vw-5	36	10	44
Ma	Made land	19	-------	--	21	45
MdA	Matapeake fine sandy loam, 0 to 2 percent slopes	20	I-5	33	7	44
MdB2	Matapeake fine sandy loam, 2 to 5 percent slopes, moderately eroded	20	IIe-5	33	7	44
MeA	Matapeake silt loam, 0 to 2 percent slopes	20	I-4	33	7	44
MeB2	Matapeake silt loam, 2 to 5 percent slopes, moderately eroded	20	IIe-4	33	7	44
MeC	Matapeake silt loam, 5 to 10 percent slopes	20	IIIe-4	34	8	44
MfA	Matawan fine sandy loam, 0 to 2 percent slopes	21	IIw-10	34	3	43
MfB	Matawan fine sandy loam, 2 to 5 percent slopes	21	IIe-36	34	3	43
MmA	Matawan loamy sand, 0 to 2 percent slopes	21	IIw-10	34	3	43
MmB	Matawan loamy sand, 2 to 5 percent slopes	21	IIe-36	34	3	43
MmC	Matawan loamy sand, 5 to 10 percent slopes	21	IIIe-36	35	3	43
MmE	Matawan loamy sand, 10 to 30 percent slopes	22	VIIe-2	37	9	44
MnA	Matawan sandy loam, 0 to 2 percent slopes	22	IIw-10	34	3	43
MnB	Matawan sandy loam, 2 to 5 percent slopes	22	IIe-36	34	3	43
MpA	Mattapex loam, 0 to 2 percent slopes	22	IIw-1	34	11	44
MpB	Mattapex loam, 2 to 5 percent slopes	23	IIe-16	34	11	44
MtA	Mattapex silt loam, 0 to 2 percent slopes	23	IIw-1	34	11	44
MtB	Mattapex silt loam, 2 to 5 percent slopes	23	IIe-16	34	11	44
Mu	Muck	23	IVw-7	36	21	45
Mv	Mixed alluvial land	23	VIw-1	37	2	42
NoA	Norfolk loamy sand, 0 to 2 percent slopes	24	IIs-4	34	7	44
NoB	Norfolk loamy sand, 2 to 5 percent slopes	24	IIs-4	34	7	44
NoC	Norfolk loamy sand, 5 to 10 percent slopes	24	IIIe-33	35	8	44
NsD	Norfolk and Sassafras soils, 10 to 15 percent slopes	24	IVe-5	36	8	44
NsE	Norfolk and Sassafras soils, 15 to 30 percent slopes	25	VIe-2	37	9	44
Ot	Othello silt loam	25	IIIw-7	35	10	44
Ow	Othello silt loam, low	25	Vw-1	36	19	45
Pe	Plummer loamy sand	26	IVw-6	36	10	44
Pk	Pocomoke loam	27	IIIw-7	35	1	42
Po	Pocomoke sandy loam	27	IIIw-6	35	1	42
Pr	Portsmouth sandy loam	28	IIIw-6	35	1	42
Pt	Portsmouth silt loam	28	IIIw-7	35	1	42
Ru	Rutlege loamy sand	28	IVw-6	36	10	44
SaA	Sassafras fine sandy loam, 0 to 2 percent slopes	29	I-5	33	7	44
SaB	Sassafras fine sandy loam, 2 to 5 percent slopes	29	IIe-5	33	7	44
SsA	Sassafras sandy loam, 0 to 2 percent slopes	30	I-5	33	7	44
SsB2	Sassafras sandy loam, 2 to 5 percent slopes, moderately eroded	30	IIe-5	33	7	44
SsC2	Sassafras sandy loam, 5 to 10 percent slopes, moderately eroded	30	IIIe-5	35	8	44
St	St. Johns loamy sand	30	Vw-5	36	10	44
Su	St. Johns mucky loamy sand	30	Vw-5	36	10	44
Sw	Swamp	31	VIIw-1	37	21	45
Tm	Tidal marsh	31	VIIIw-1	37	21	45
WfA	Woodstown fine sandy loam, 0 to 2 percent slopes	32	IIw-5	34	3	43
WfB	Woodstown fine sandy loam, 2 to 5 percent slopes	32	IIe-36	34	3	43
WoA	Woodstown loam, 0 to 2 percent slopes	32	IIw-1	34	3	43
WsA	Woodstown sandy loam, 0 to 2 percent slopes	32	IIw-5	34	3	43
WsB	Woodstown sandy loam, 2 to 5 percent slopes	32	IIe-36	34	3	43

326-752 O - 68 (Face p. 90)

1

N

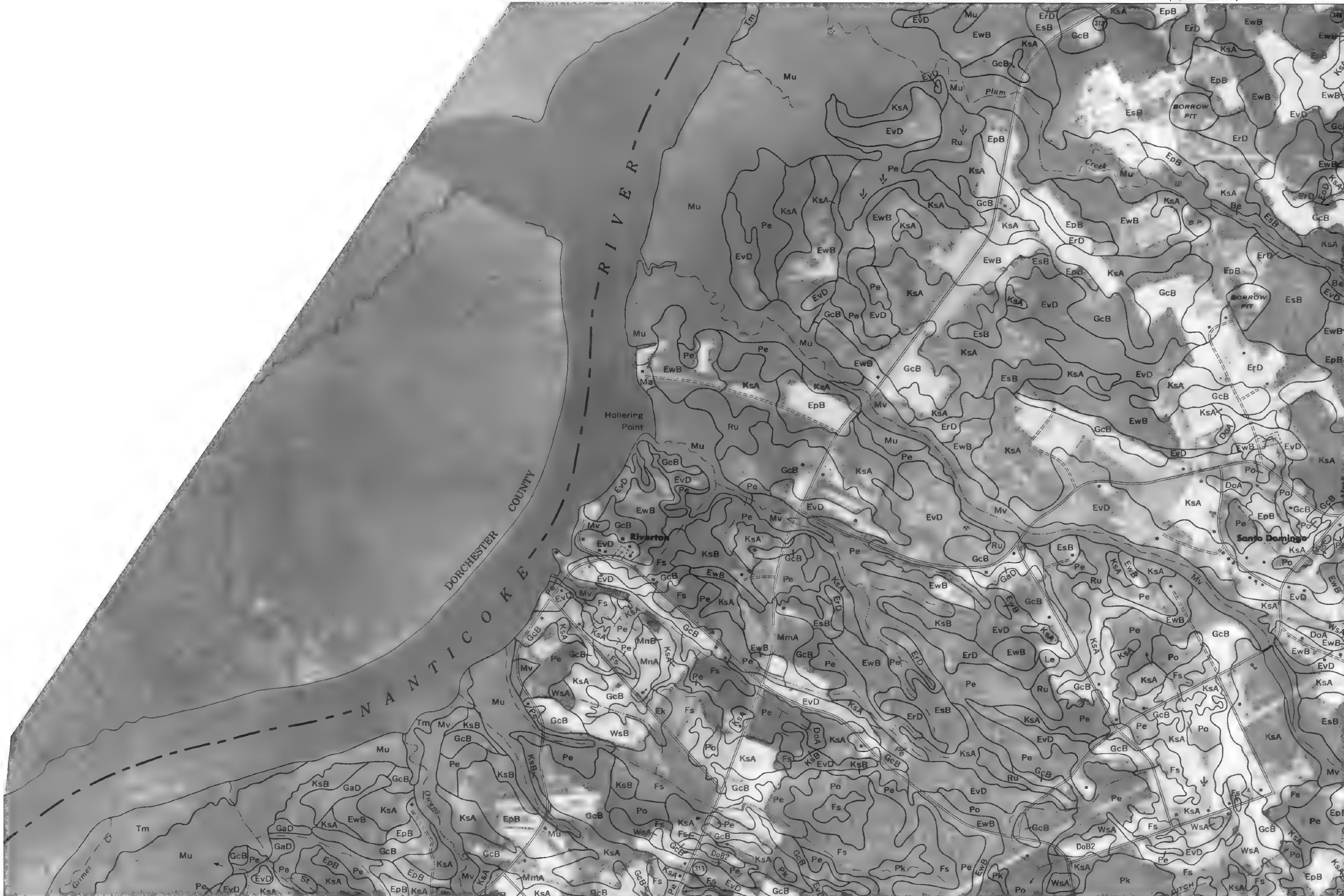
WICOMICO COUNTY, MARYLAND NO. 1

0 ½ 1 Mile Scale 1:15 840 0 5 000 Feet

(Joins sheet 2) | *(Joins inset, sheet 5)*

N

(Joins sheet 1)



(Joins inset, sheet 5)

(Joins sheet 4)

0 ½ 1 Mile

Scale 1:15 840

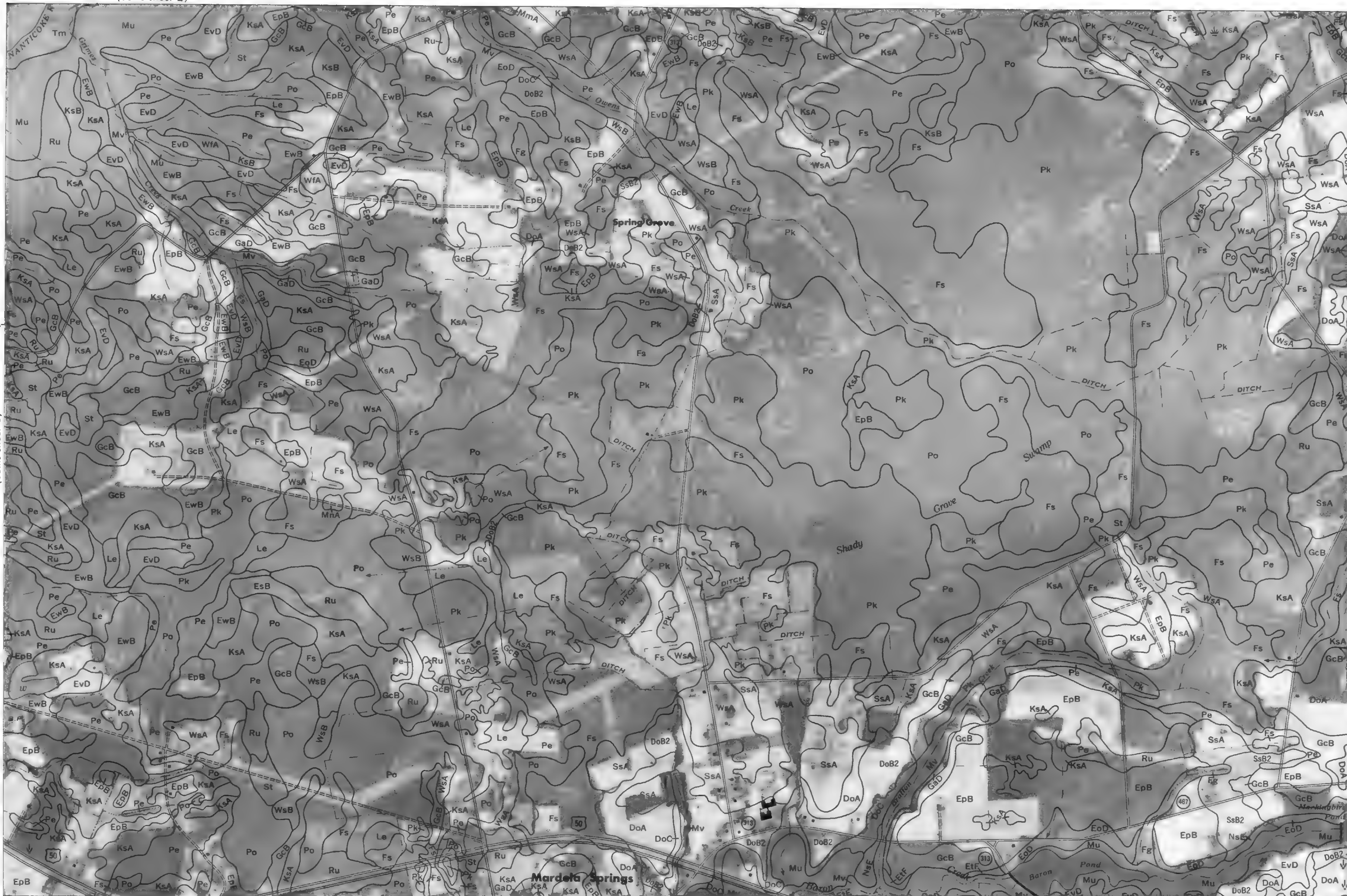
0 5 000 Feet

3
N
NANTICOKE RIVER
DORCHESTER COUNTY
Ferry Point
Baron Creek Point
BRIDGE CREEK
BARON CREEK
Stump Gut
(Joins sheet 4)
(Joins sheet 6)
Tm
Mu
Pe
Ru
KsA
KsB
EsB
GcB
EpB
EwB
EvD
WsA
Po
St
Le
Fs
DoB2
50
Scale 1:15 840
0
½
1 Mile
5 000 Feet

4

(Joins sheet 2)

(Joins sheet 3)



(Joins sheet 5)

(Joins sheet 7)

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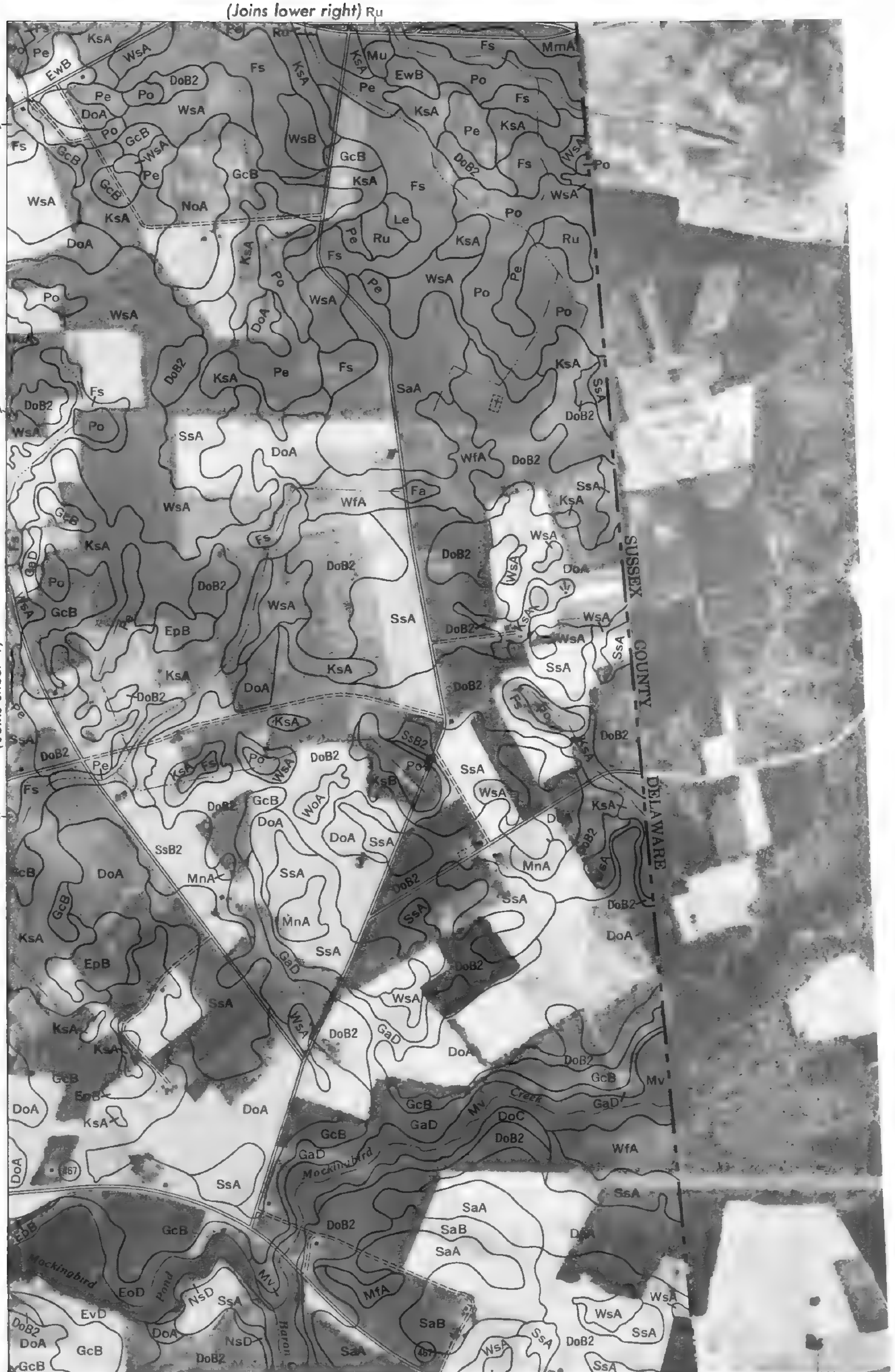
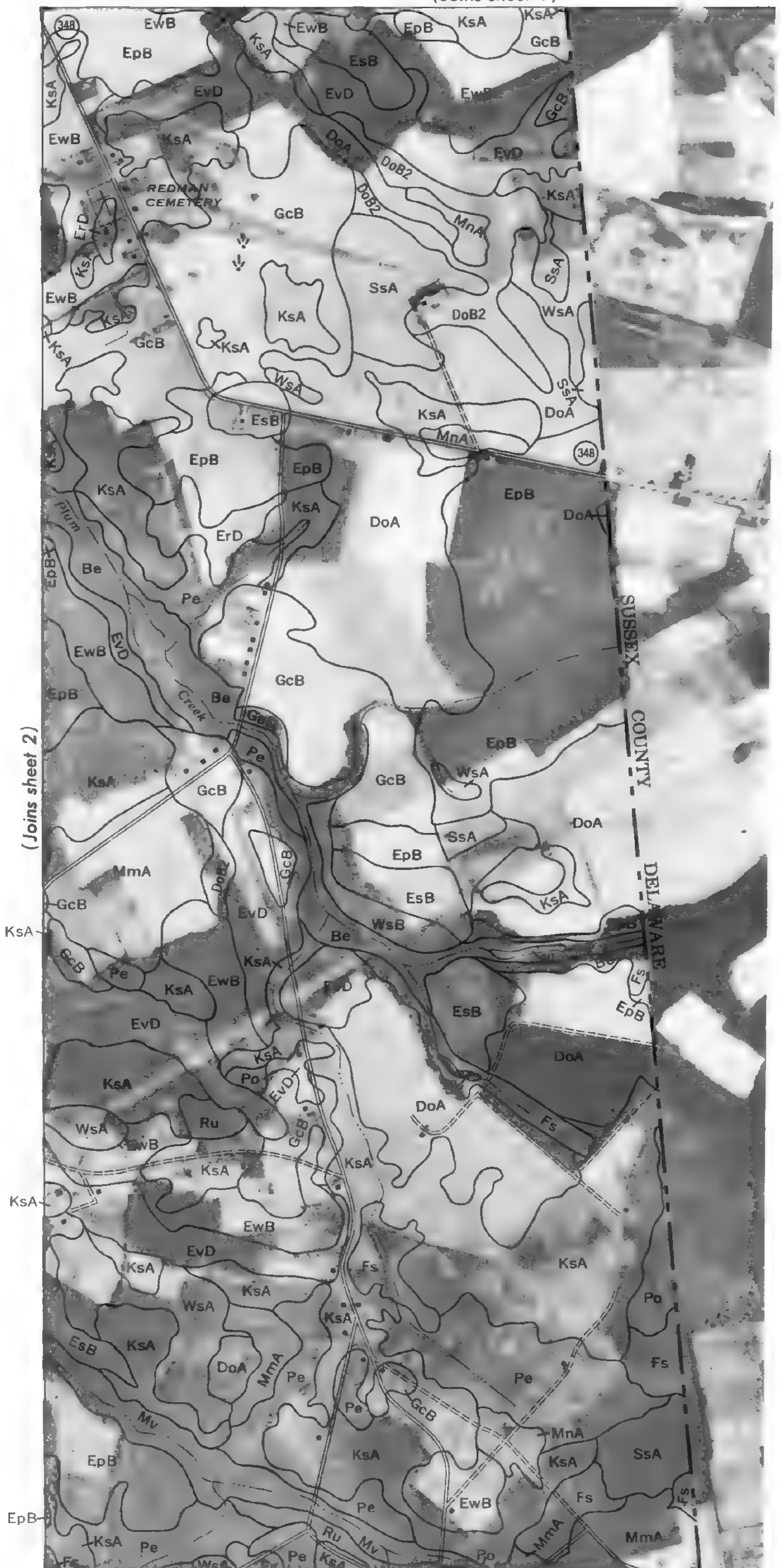

(Joins lower right)
(Joins sheet 4)
(Joins sheet 8)
SUSSEX COUNTY
DELAWARE
Mockingbird Creek
Mockingbird Pond
WsA
DoA
GcB
DoC
WoA
0
½
1 Mile


(Joins sheet 1)
(Joins sheet 2)
(Joins upper left)
REDMAN CEMETERY
Plum Creek
SUSSEX COUNTY
DELAWARE
348
KsA
EpB
0
5 000 Feet
Scale 1:15 840
N

WICOMICO COUNTY, MARYLAND — SHEET NUMBER 6

0 ½ 1 Mile Scale 1:15 840 0 5 000 Feet

(Joins sheet 4)

7

(Joins sheet 6)

(Joins sheet 8)

(Joins sheet 15)

0 ½ 1 Mile

Scale 1:15 840

0 5 000 Feet

8

(Joins sheet 5)

(Joins sheet 7)

(Joins sheet 9)

(Joins sheet 16)

0 ½ 1 Mile

Scale 1:15 840

0 5 000 Feet

0 ½ 1 Mile Scale 1:15 840 0 5 000 Feet

WICOMICO COUNTY, MARYLAND NO. 9

(10)

N

(Joins sheet 9)

(Joins sheet 11)

(Joins sheet 18)

0 ½ 1 Mile

Scale 1:15 840

0 5 000 Feet

N

(Joins sheet 10)

(Joins sheet 12)

(Joins sheet 19)

0 ½ 1 Mile

Scale 1:15 840

0 5 000 Feet

(Joins sheet 20)

0 ½ 1 Mile Scale 1:15 840 0 5 000 Feet

WICOMICO COUNTY, MARYLAND NO. 13


N
(Joins sheet 6)
(Joins sheet 15)
(Joins sheet 22)
NANTICOKE RIVER
DORCHESTER COUNTY
Marshall Point
Pole Point
THE INLET
RAGS
THOROFARE
BRIDGE THOROFARE
Little Thorofare
ATHEL NECK
Athol
Camphels Wharf
REWASTICO CREEK
FARRINGTON NECK
0
½
1 Mile
Scale 1:15 840
0
5 000 Feet

0 ½ 1 Mile Scale 1:15 840 0 5 000 Feet

16

(Joins sheet 8)

(Joins sheet 15)

(Joins sheet 17)

(Joins sheet 24)

0 ½ 1 Mile

Scale 1:15 840

0 5 000 Feet

(Joins sheet 9)

(17)

WICOMICO COUNTY, MARYLAND NO. 17

(Joins sheet 16)

(Joins sheet 18)

(Joins sheet 25)

0 ½ 1 Mile

Scale 1:15 840

0 5 000 Feet

18

(Joins sheet 10)

(Joins sheet 17)

(Joins sheet 19)

(Joins sheet 26)

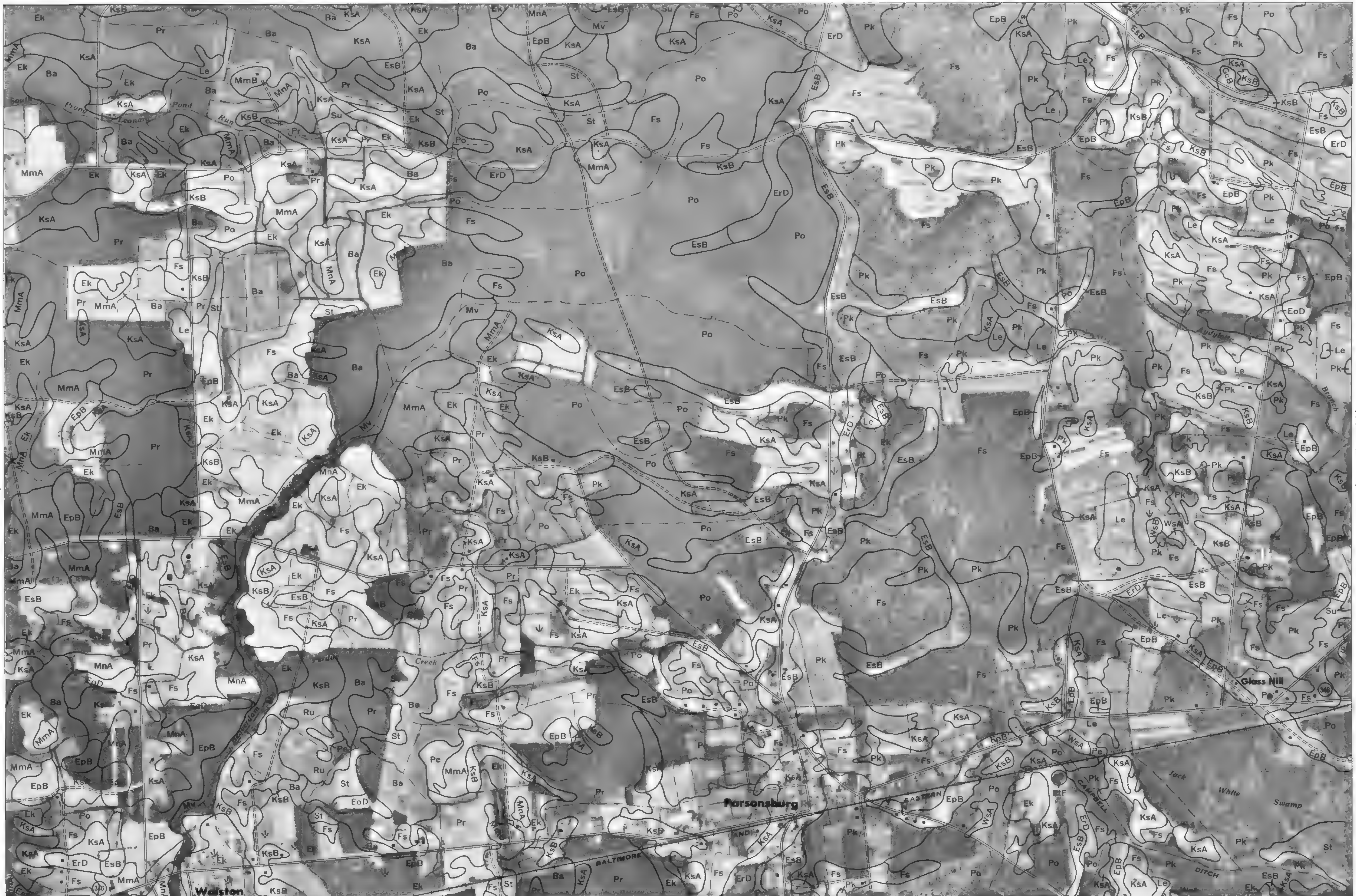
0 ½ 1 Mile

Scale 1:15 840

0 5 000 Feet

(Joins sheet 11)

(Joins sheet 18)



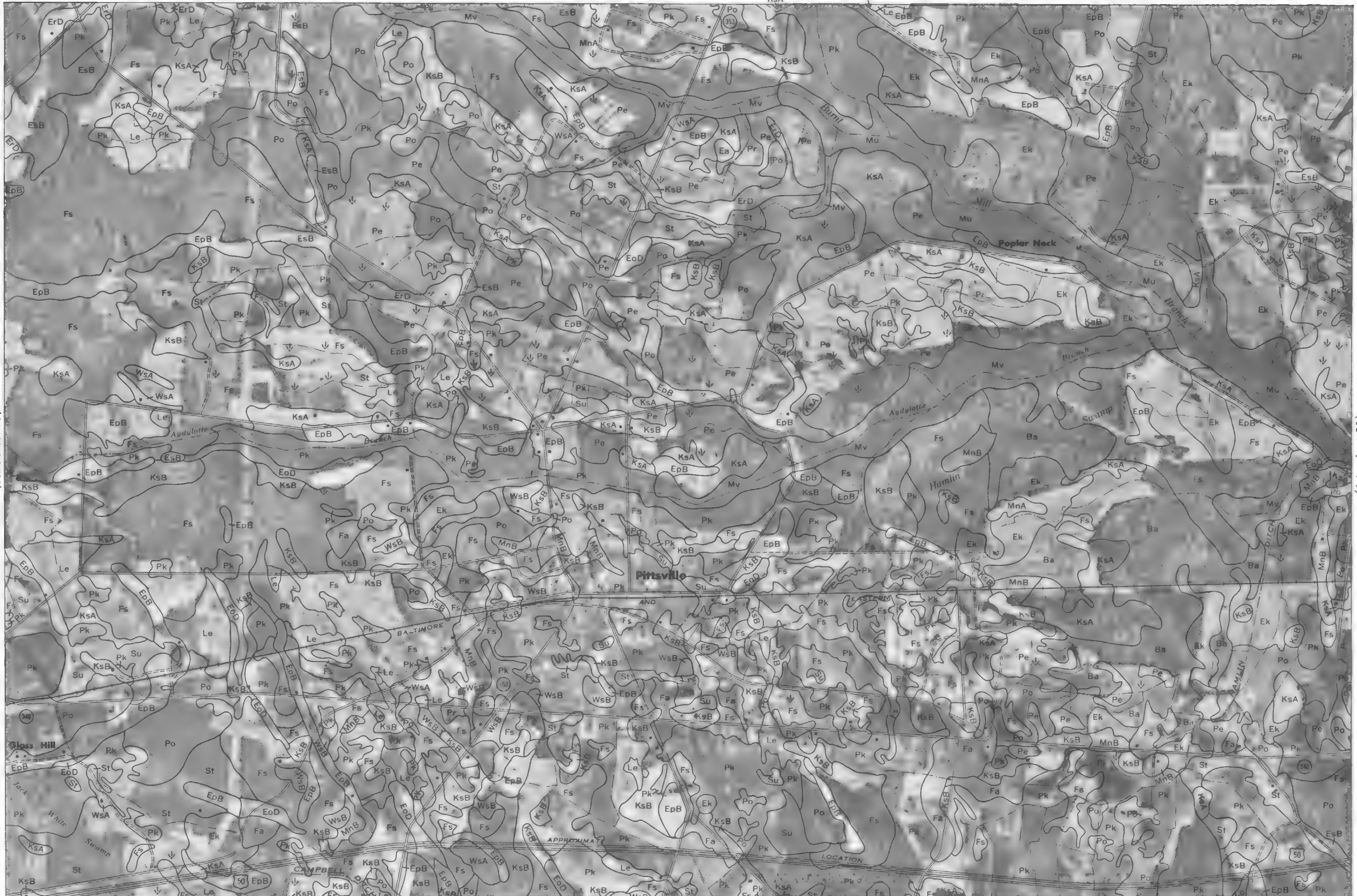
(Joins sheet 20)

(Joins sheet 27)

0 ½ 1 Mile Scale 1:15 840 0 5 000 Feet

(Joins sheet 12)

N



(Joins sheet 19)

(Joins sheet 21)

(Joins sheet 28)

0 ½ 1 Mile

Scale 1:15 840

0 5 000 Feet

(Joins sheet 13)

WICOMICO COUNTY, MARYLAND NO. 21

(Joins sheet 20)

(Joins sheet 29)

0 ½ 1 Mile Scale 1:15 840 0 5 000 Feet

(22)

(Joins sheet 14)

(Joins inset, sheet 6)

(Joins sheet 23)

(Joins sheet 31)

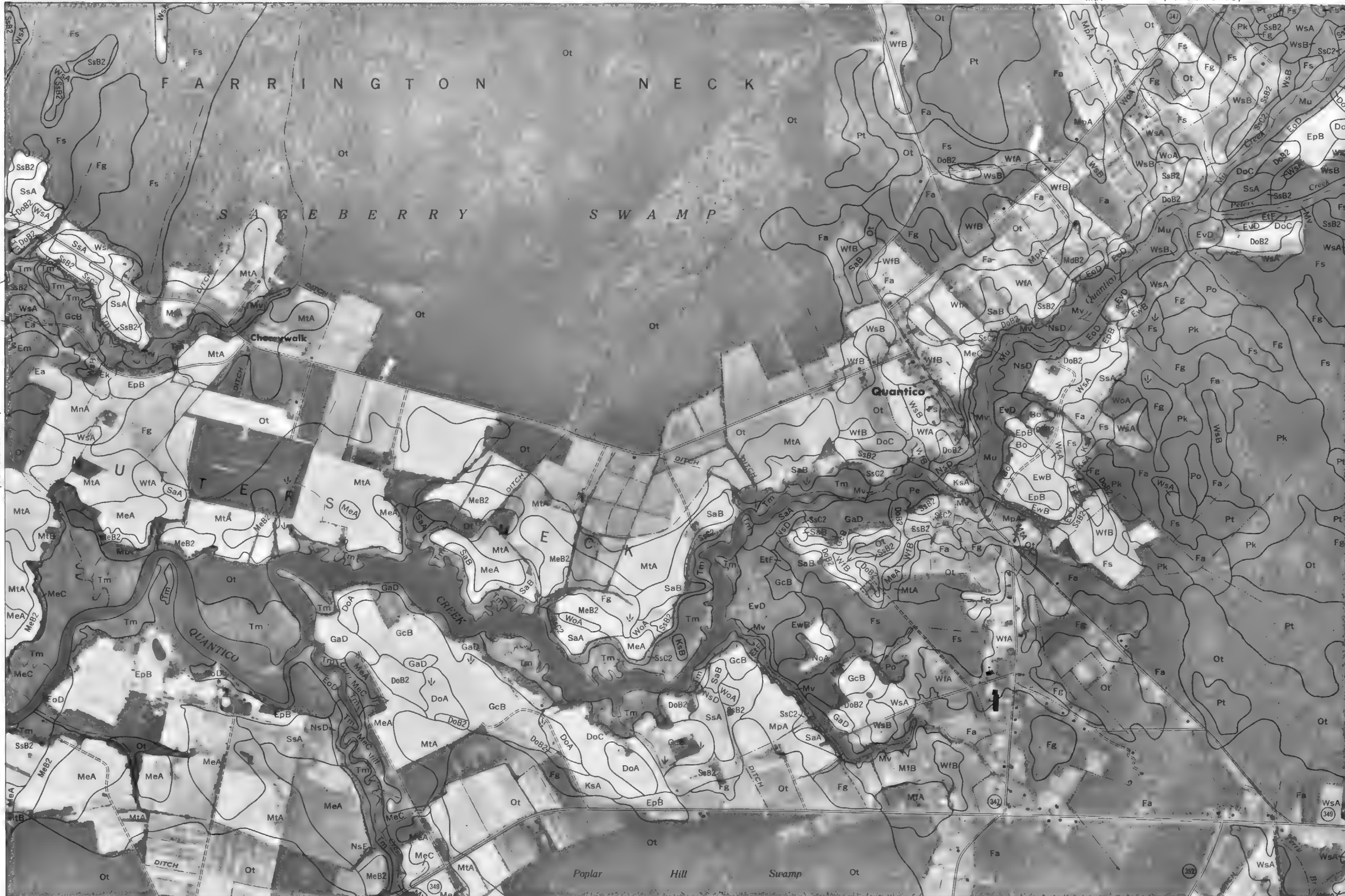
0 ½ 1 Mile Scale 1:15 840 0 5 000 Feet

(Joins sheet 15)

23

WICOMICO COUNTY, MARYLAND NO. 23

(Joins sheet 22)



(Joins sheet 24)

(Joins sheet 32)

0 ½ 1 Mile Scale 1:15 840 0 5 000 Feet

24

(Joins sheet 16)

(Joins sheet 23)

(Joins sheet 25)

(Joins sheet 33)

0 ½ 1 Mile

Scale 1:15 840

0 5 000 Feet

(Joins sheet 17)

25

(Joins sheet 24)

(Joins sheet 26)

(Joins sheet 34)

0 ½ 1 Mile

Scale 1:15 840

0 5 000 Feet

26

(Joins sheet 18)

(Joins sheet 25)

(Joins sheet 27)

(Joins sheet 35)

0 ½ 1 Mile

Scale 1:15 840

0 5 000 Feet

(Joins sheet 19)

WICOMICO COUNTY, MARYLAND NO. 27

(Joins sheet 26)

(Joins sheet 28)

(Joins sheet 36)

0 ½ 1 Mile

Scale 1:15 840

0 5 000 Feet

(28)

(Joins sheet 20)

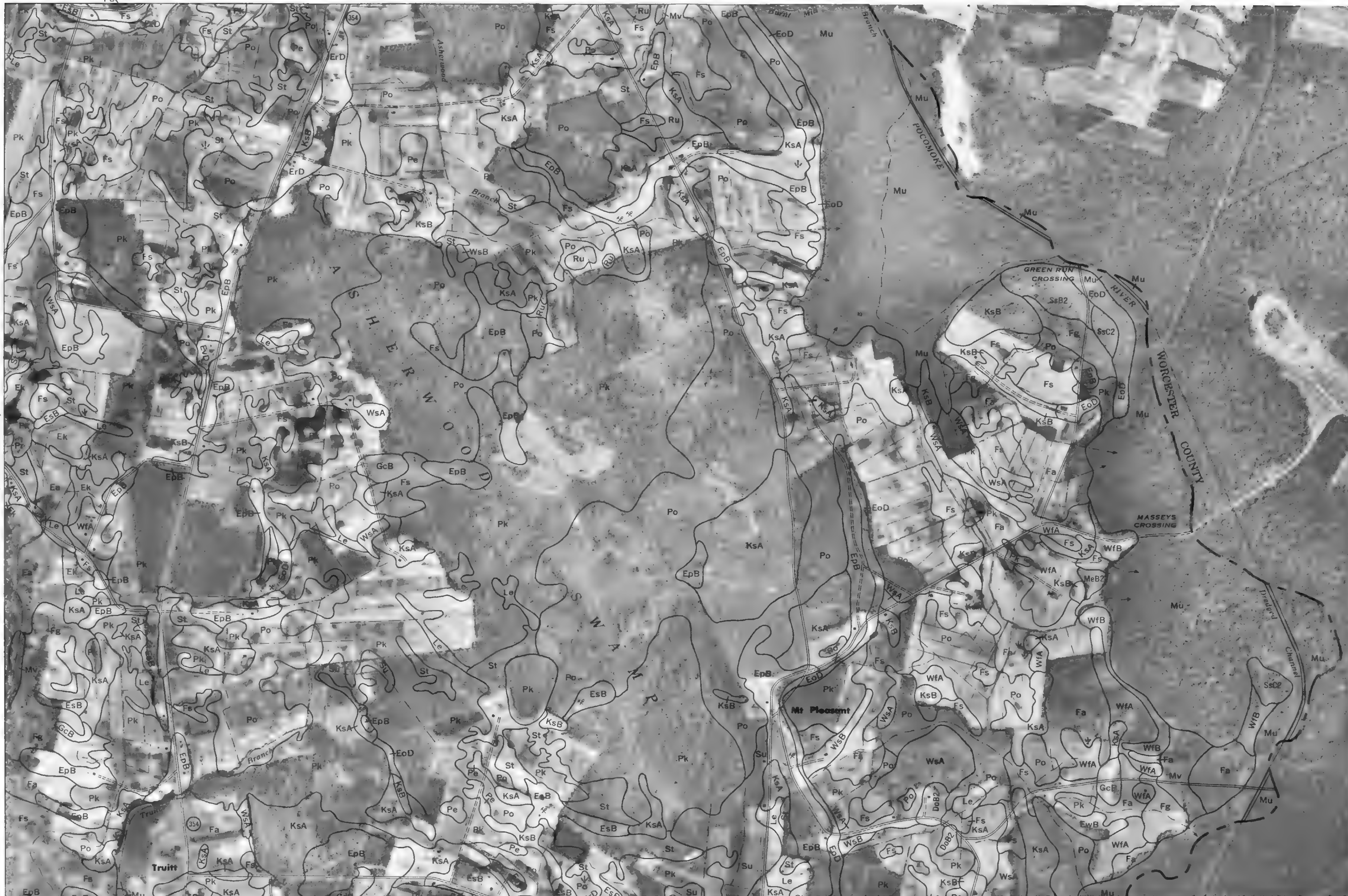
(Joins sheet 27)

(Joins sheet 29)

(Joins sheet 37)

0 ½ 1 Mile Scale 1:15 840 0 5 000 Feet

(Joins sheet 21)

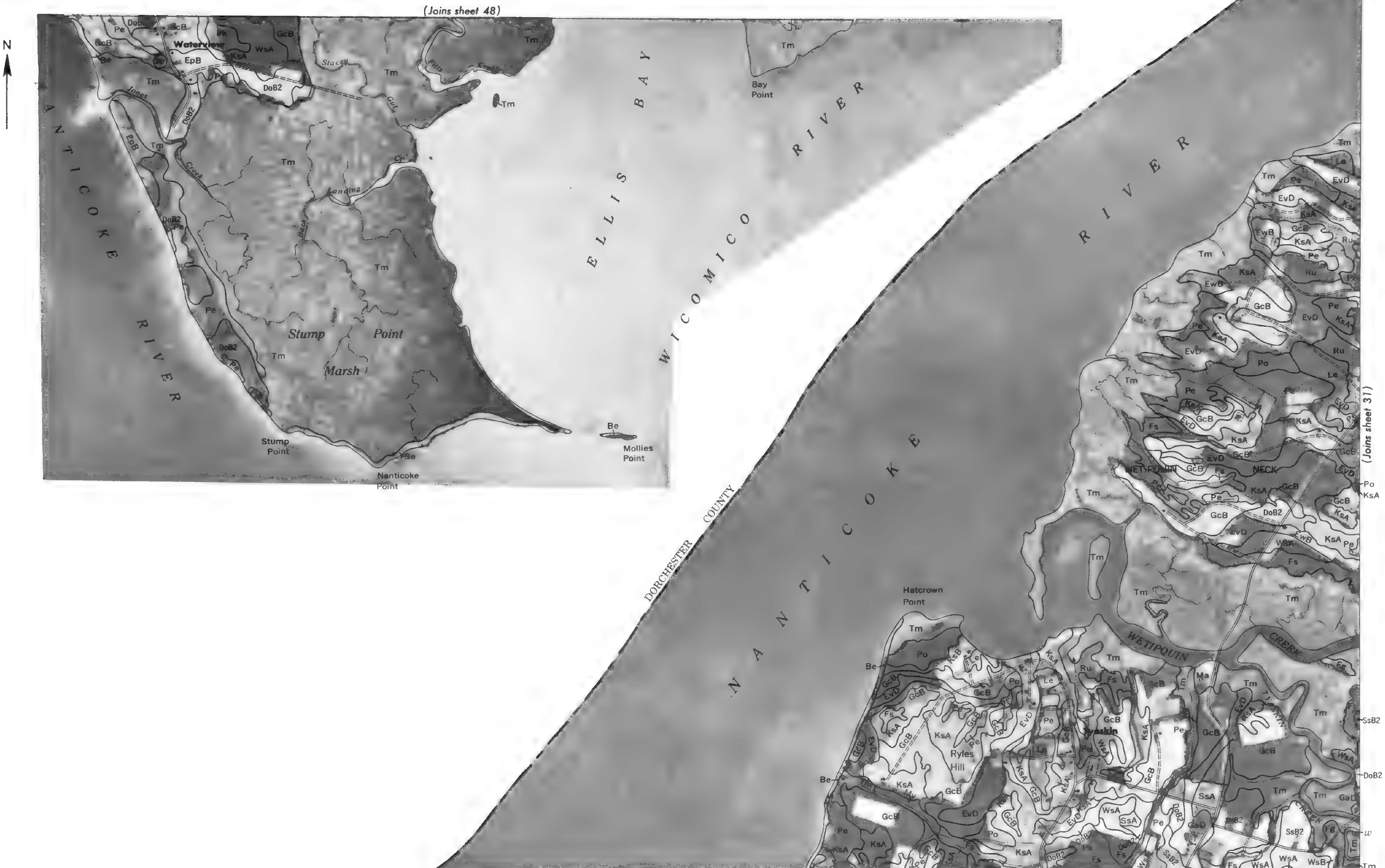


(Joins sheet 28)

(Joins sheet 38)

0 ½ 1 Mile
Scale 1:15 840
0 5 000 Feet

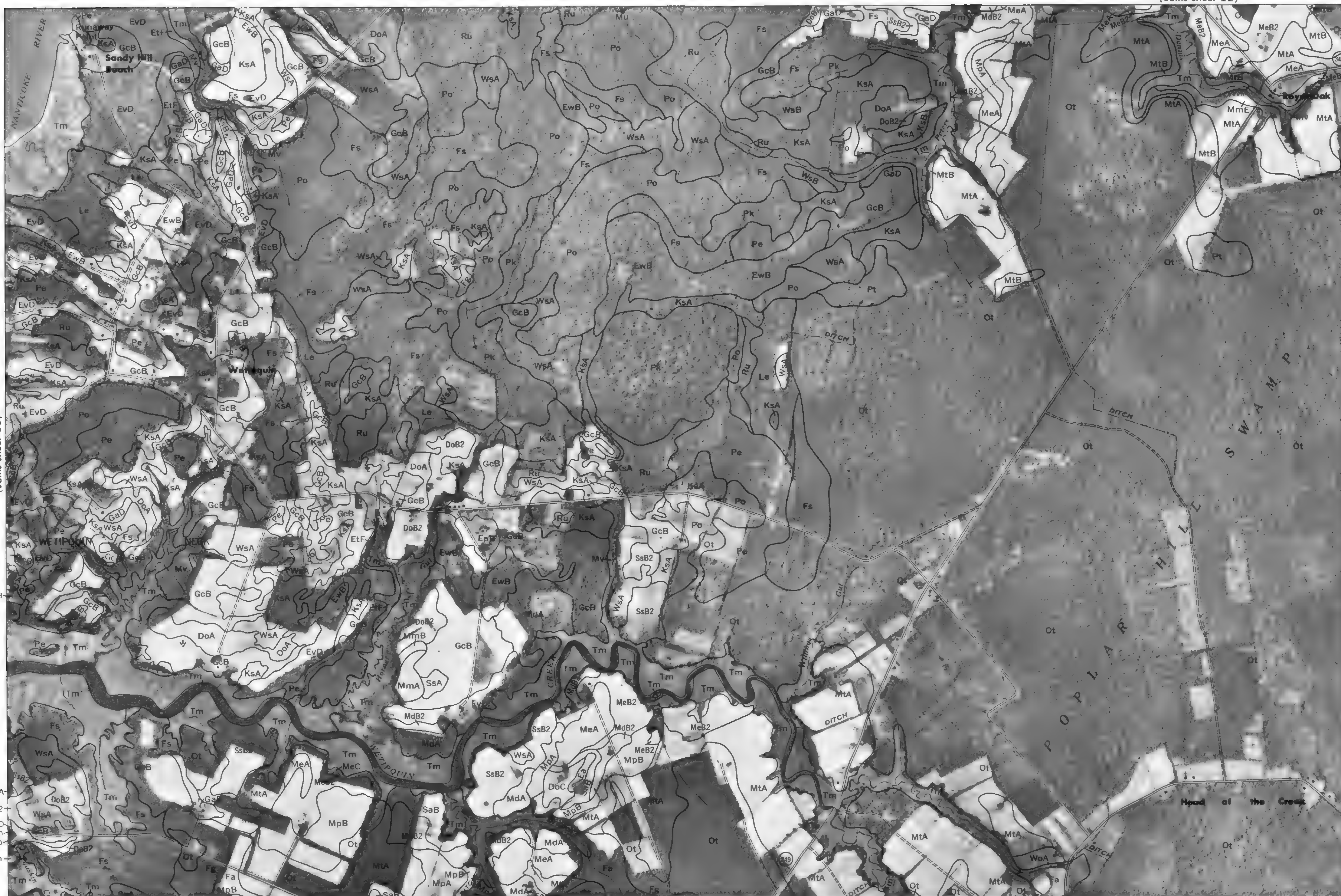
29



0 ½ 1 Mile Scale 1:15 840 0 5 000 Feet

(Joins sheet 22)

31



(Joins sheet 30)

(Joins sheet 32)

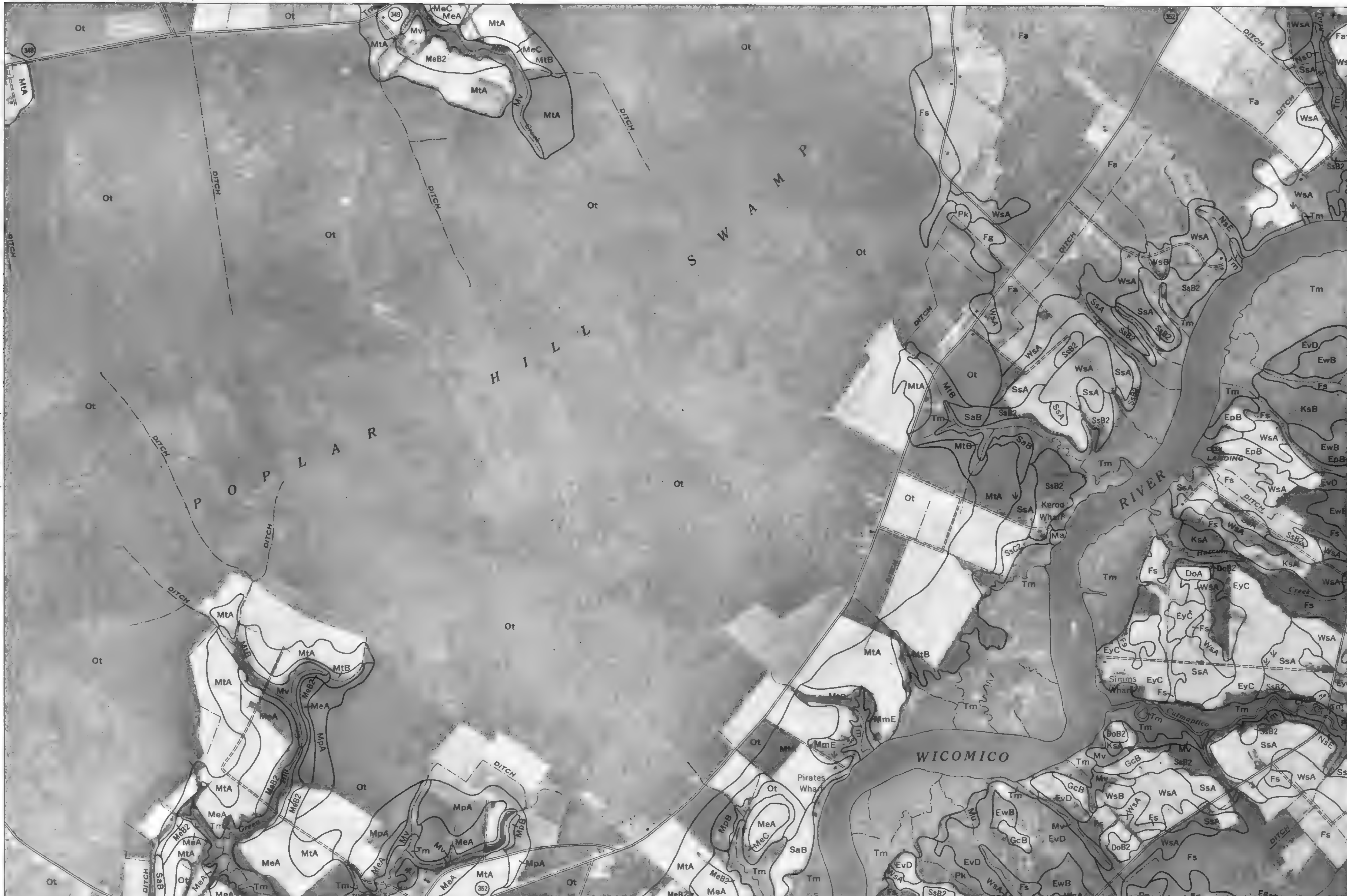
EwB
WsA
DoB2
GaD
Tm
GaD
Tm
Tm

(Joins sheet 40)

0 ½ 1 Mile Scale 1:15 840 0 5 000 Feet

(Joins sheet 23)

(Joins sheet 31)



(Joins sheet 33)

(Joins sheet 41)

0 ½ 1 Mile

Scale 1:15 840

0 5 000 Feet

33

(Joins sheet 24)

(Joins sheet 32)

(Joins sheet 34)

(Joins sheet 42)

0 ½ 1 Mile

Scale 1:15 840

0 5 000 Feet

WICOMICO COUNTY, MARYLAND NO. 33

34

(Joins sheet 25)

(Joins sheet 33)

(Joins sheet 35)

(Joins sheet 43)

0 ½ 1 Mile

Scale 1:15 840

0 5 000 Feet

(Joins sheet 26)

35

(Joins sheet 34)

(Joins sheet 36)

(Joins sheet 44)

0 ½ 1 Mile

Scale 1:15 840

0 5 000 Feet

(Joins sheet 27)

N

(Joins sheet 35)

(Joins sheet 37)

(Joins sheet 45)

0 ½ 1 Mile

Scale 1:15 840

0 5 000 Feet

(Joins sheet 28)

37

WICOMICO COUNTY, MARYLAND NO. 37

(Joins sheet 36)

(Joins sheet 38)

(Joins sheet 46)

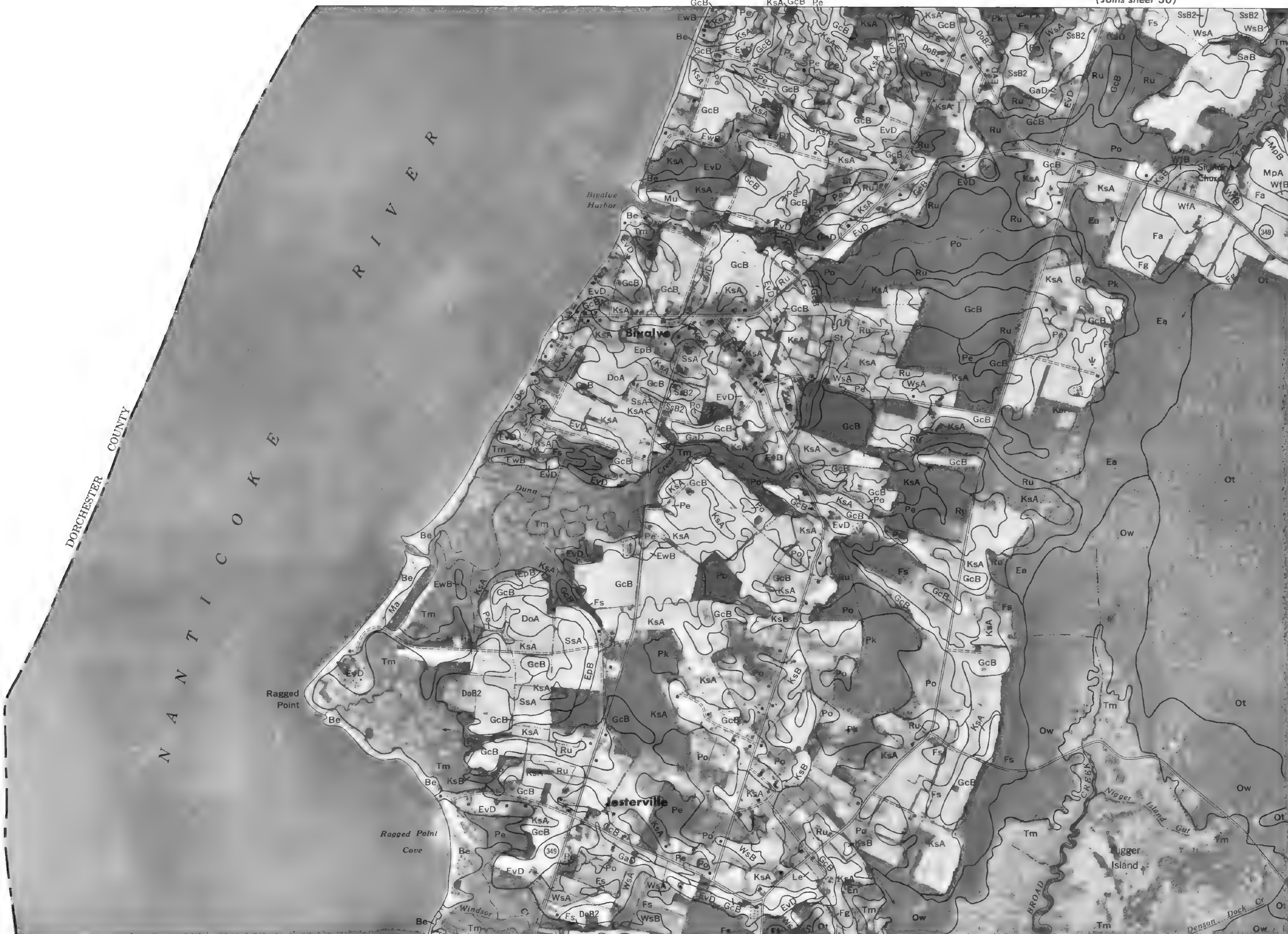
0 ½ 1 Mile Scale 1:15 840 0 5 000 Feet

38

WICOMICO COUNTY, MARYLAND NO. 38

(Joins sheet 30)

39



(Joins sheet 48)

0 ½ 1 Mile Scale 1:15 840 0 5 000 Feet

40

(Joins sheet 31)

(Joins sheet 39)

(Joins sheet 41)

(Joins sheet 49)

0 ½ 1 Mile Scale 1:15 840 0 5 000 Feet

(Joins sheet 32)

41

WICOMICO COUNTY, MARYLAND NO. 41

(Joins sheet 40)

(Joins sheet 42)

(Joins sheet 50)

0 ½ 1 Mile

Scale 1:15 840

0 5 000 Feet

(Joins sheet 33)

N

(Joins sheet 41)

(Joins sheet 43)

(Joins inset, sheet 50)

0 ½ 1 Mile

Scale 1:15 840

0 5 000 Feet

(Joins sheet 34)

43

WICOMICO COUNTY, MARYLAND NO. 43

(Joins sheet 42)

(Joins sheet 44)

0 ½ 1 Mile

Scale 1:15 840

0 5 000 Feet

0 ½ 1 Mile
Scale 1:15 840
0 5 000 Feet

(Joins sheet 36)

(Joins sheet 44)

(Joins sheet 46)

0 ½ 1 Mile Scale 1:15 840 0 5 000 Feet

46

(Joins sheet 37)

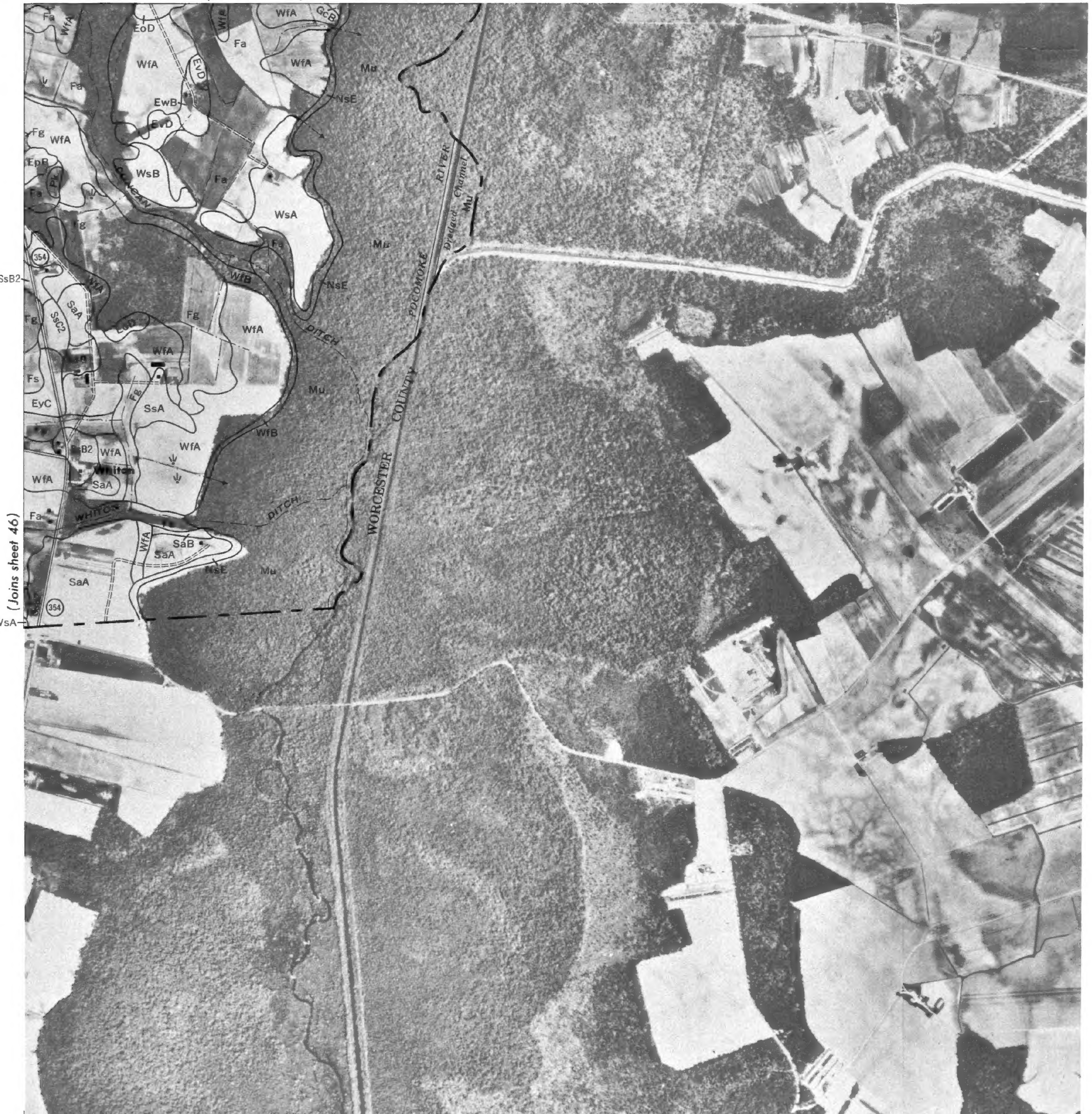
(Joins sheet 45)

(Joins sheet 47)

0 ½ 1 Mile Scale 1:15 840 0 5 000 Feet

47

(Joins sheet 38)



(Joins sheet 46)

WICOMICO COUNTY, MARYLAND NO. 47

N

0 ½ 1 Mile Scale 1:15 840 0 5 000 Feet

WICOMICO COUNTY, MARYLAND — SHEET NUMBER 48

(Joins sheet 39)

(Joins sheet 49)

(Joins inset, sheet 30)

0 ½ 1 Mile

Scale 1:15 840

0 5 000 Feet

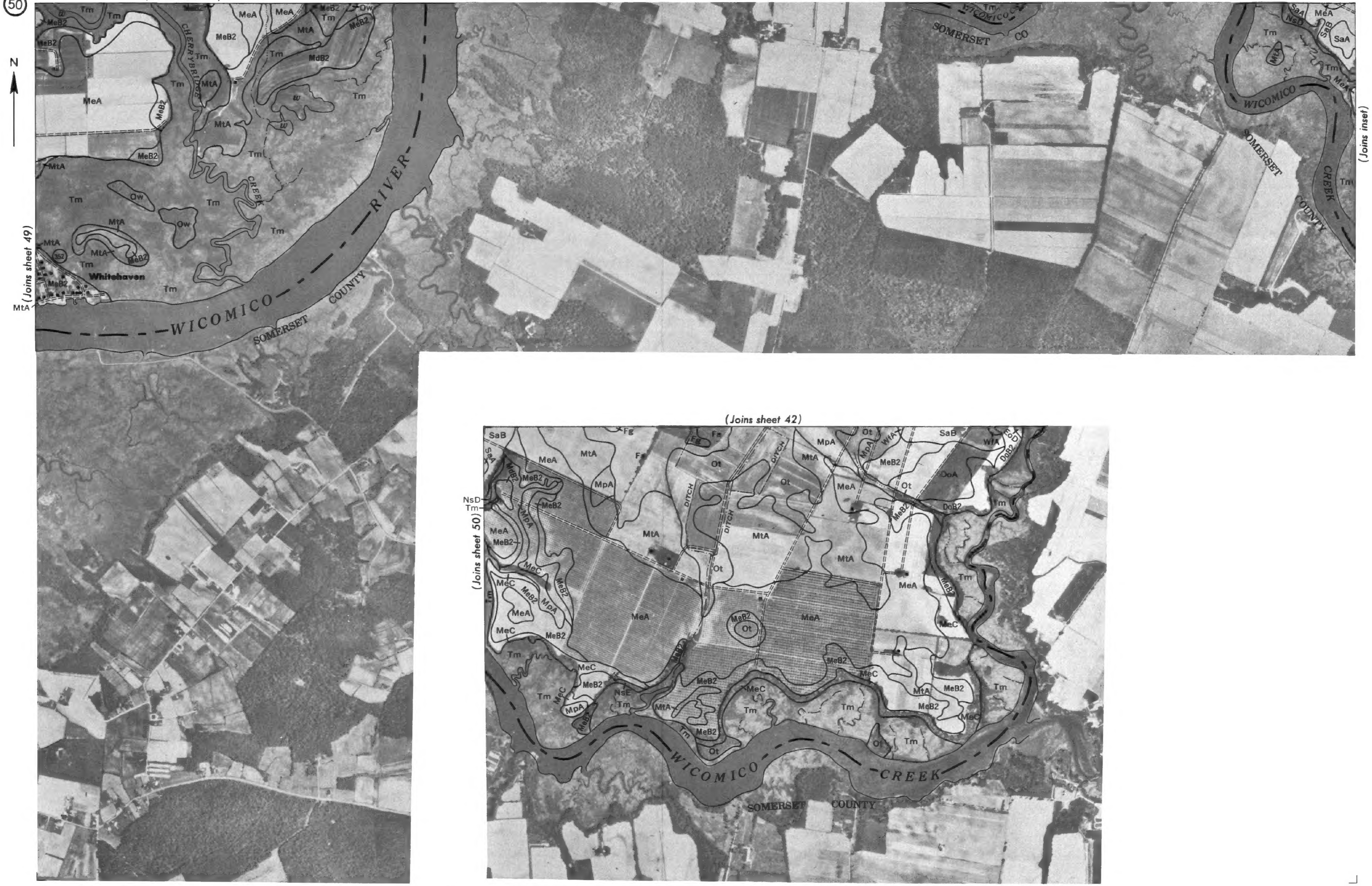
(Joins sheet 40)

49

(Joins sheet 48)

(Joins sheet 50)

0 ½ 1 Mile Scale 1:15 840 0 5 000 Feet



0 ½ 1 Mile

Scale 1:15 840

0 5 000 Feet